

FIG. 1

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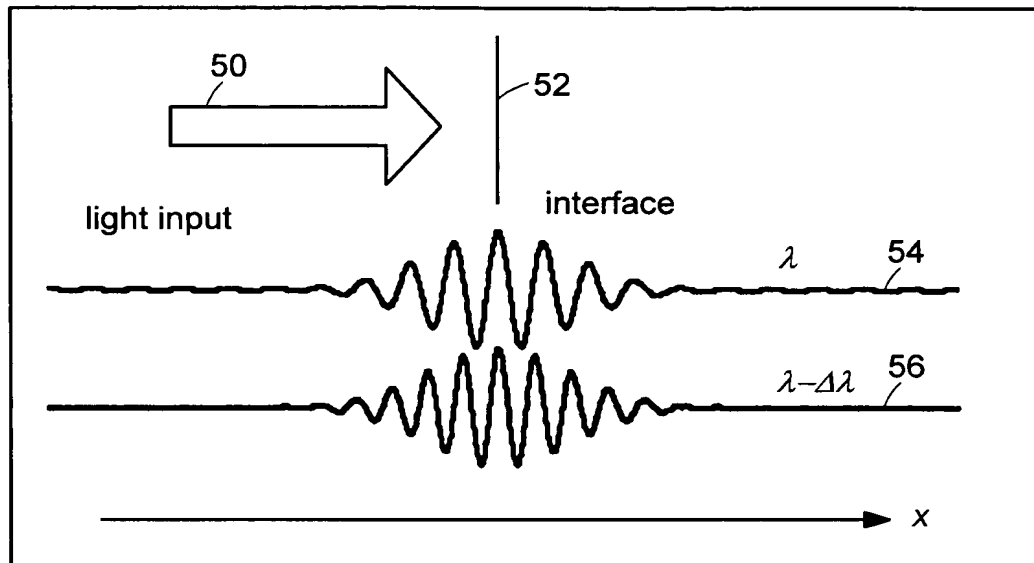


FIG. 2

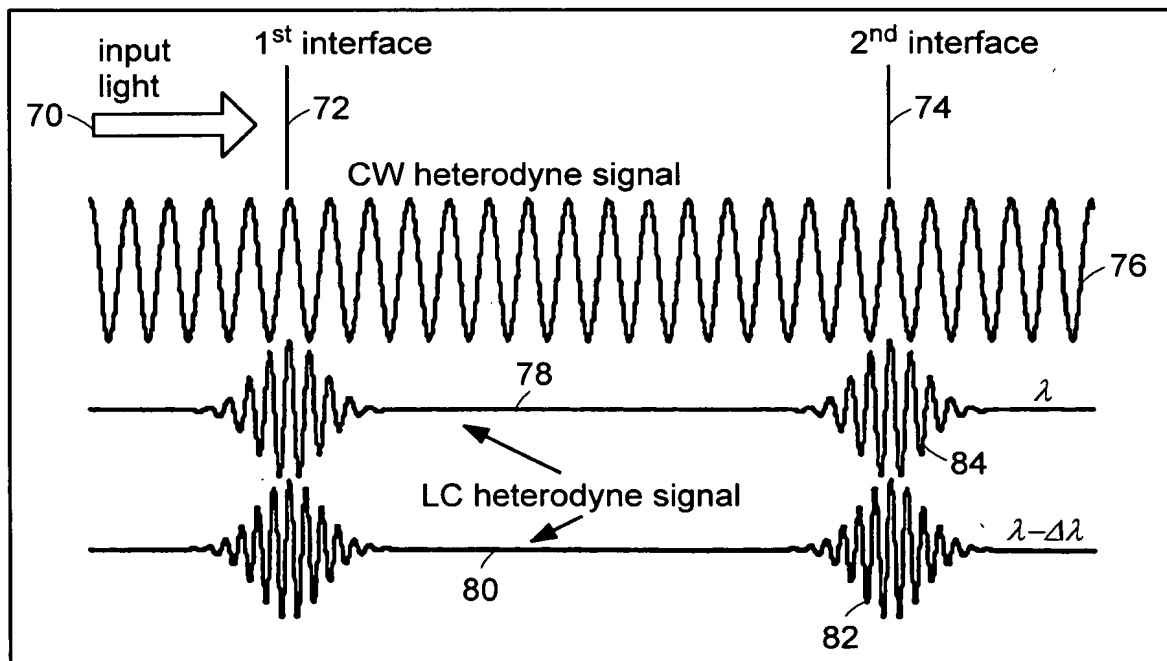


FIG. 3

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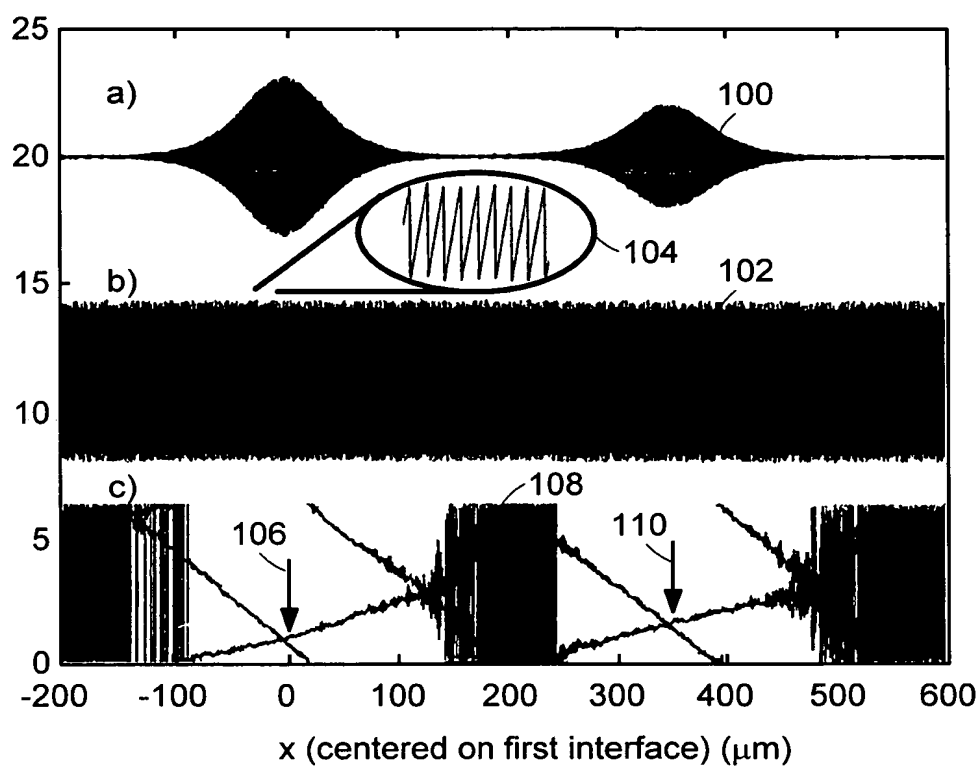


FIG. 4

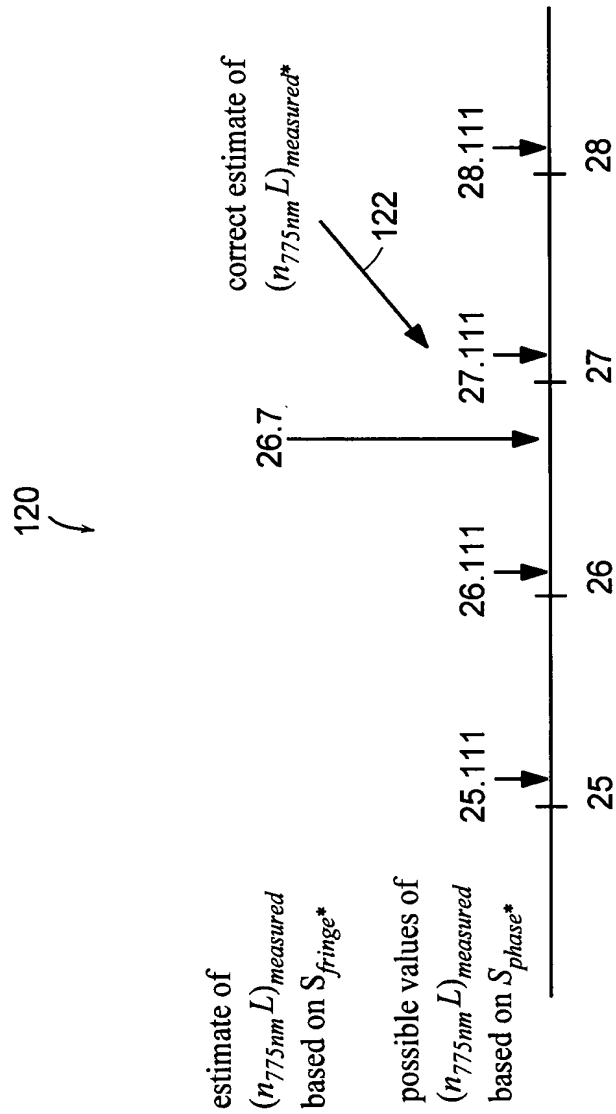


FIG. 5

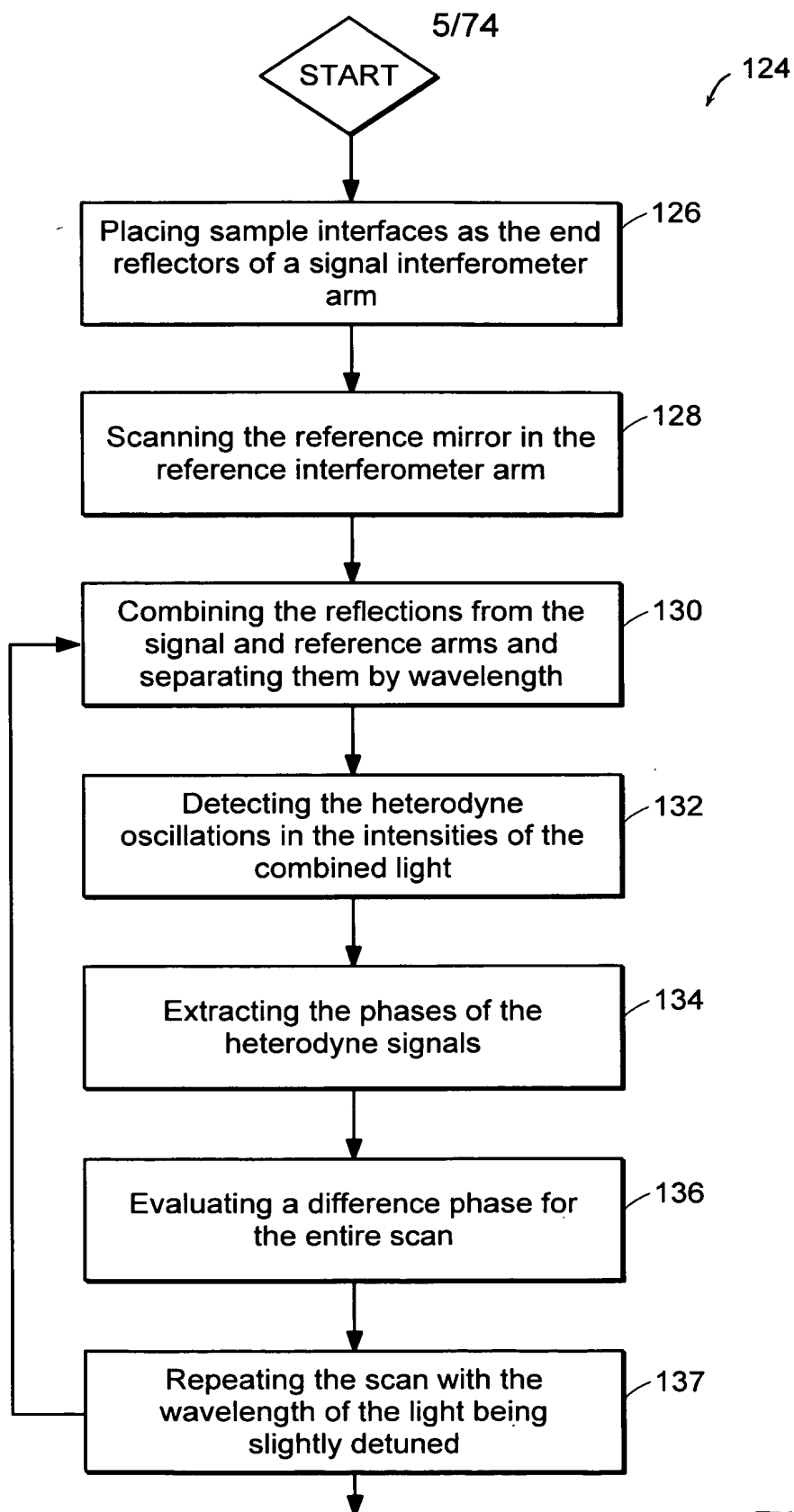


FIG. 6A

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From FIG. 6A

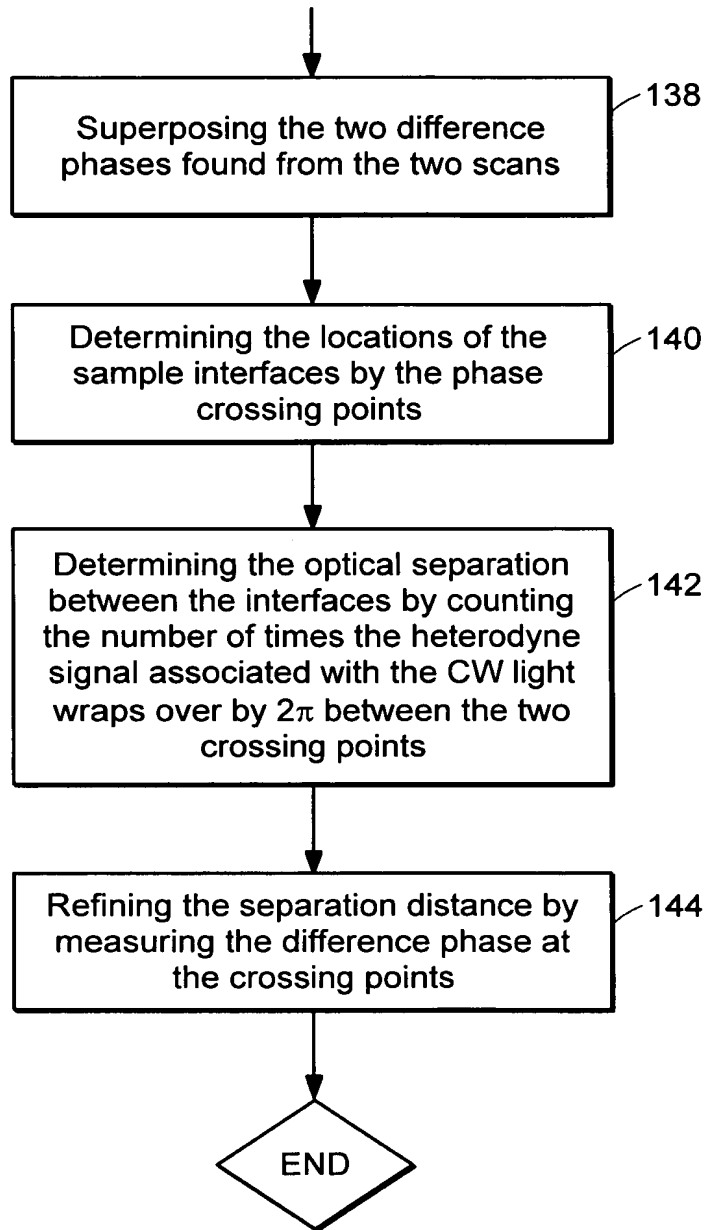


FIG. 6B

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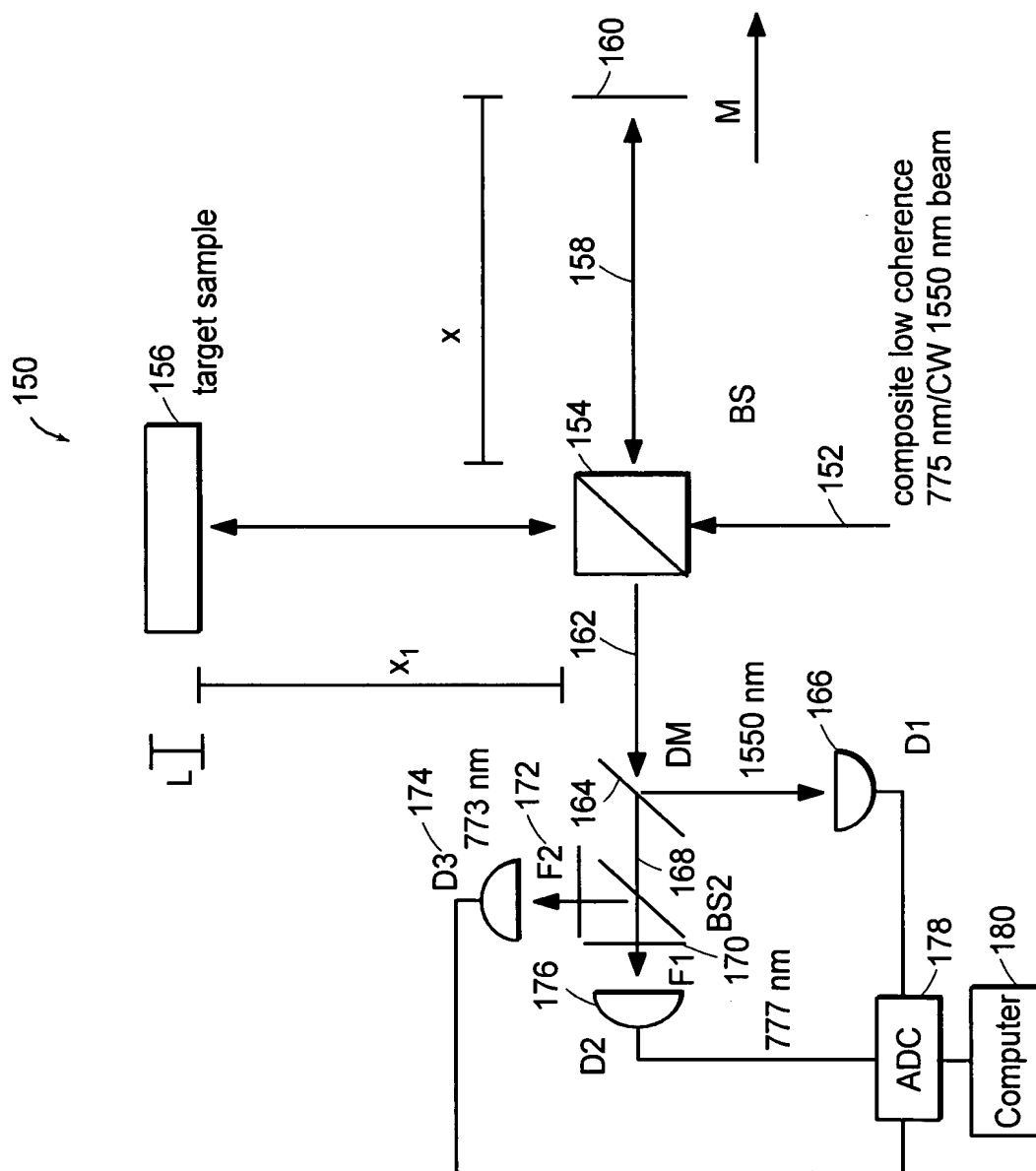


FIG. 7

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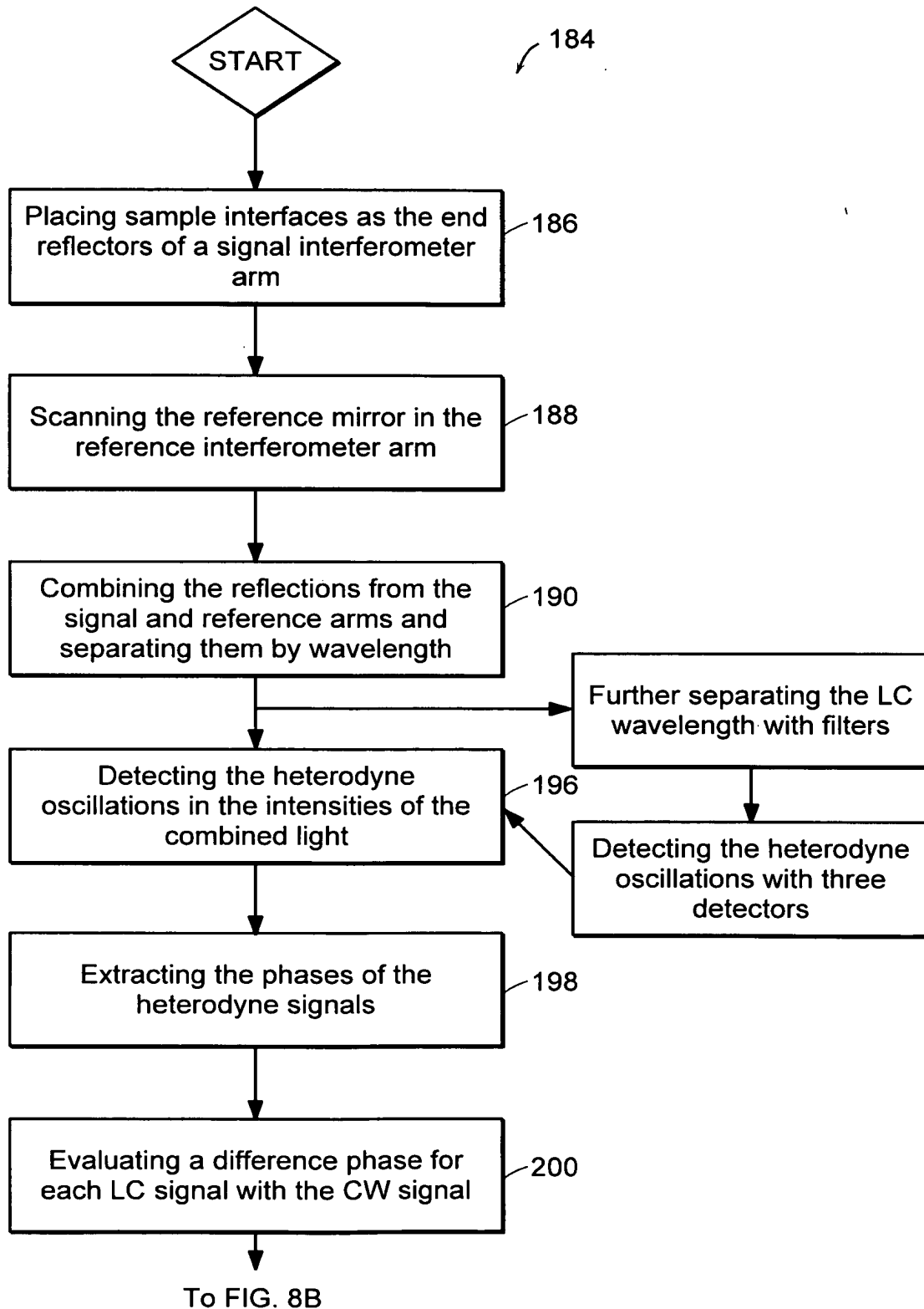


FIG. 8A

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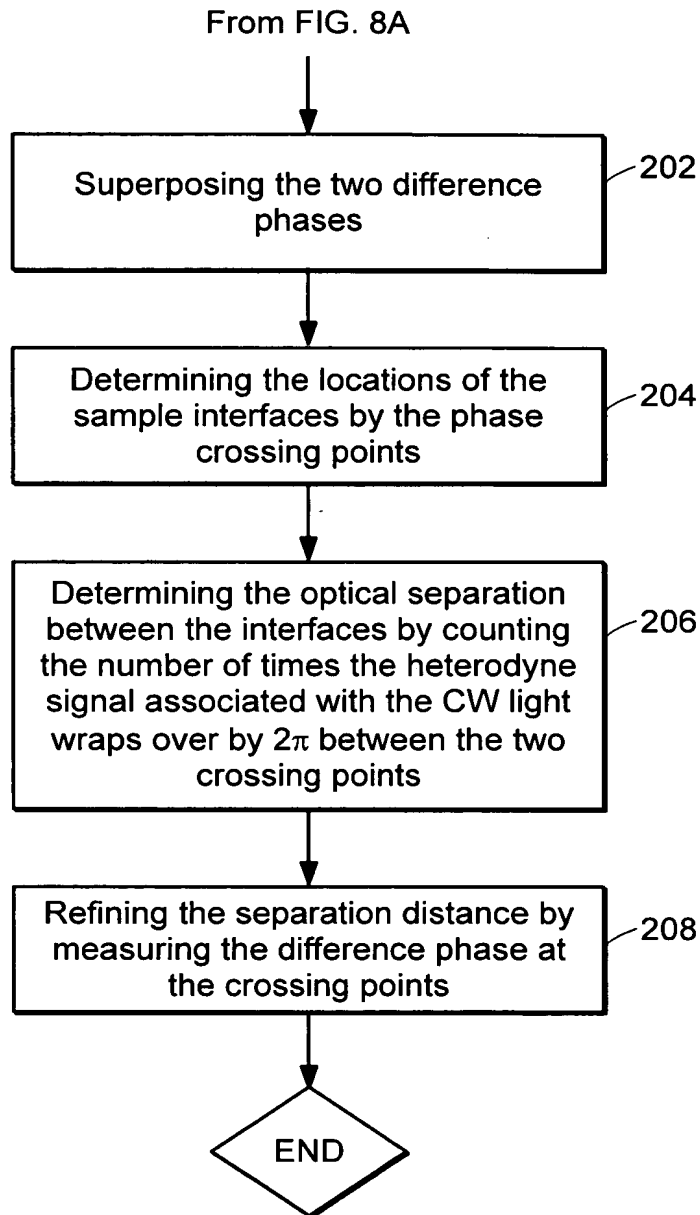


FIG. 8B

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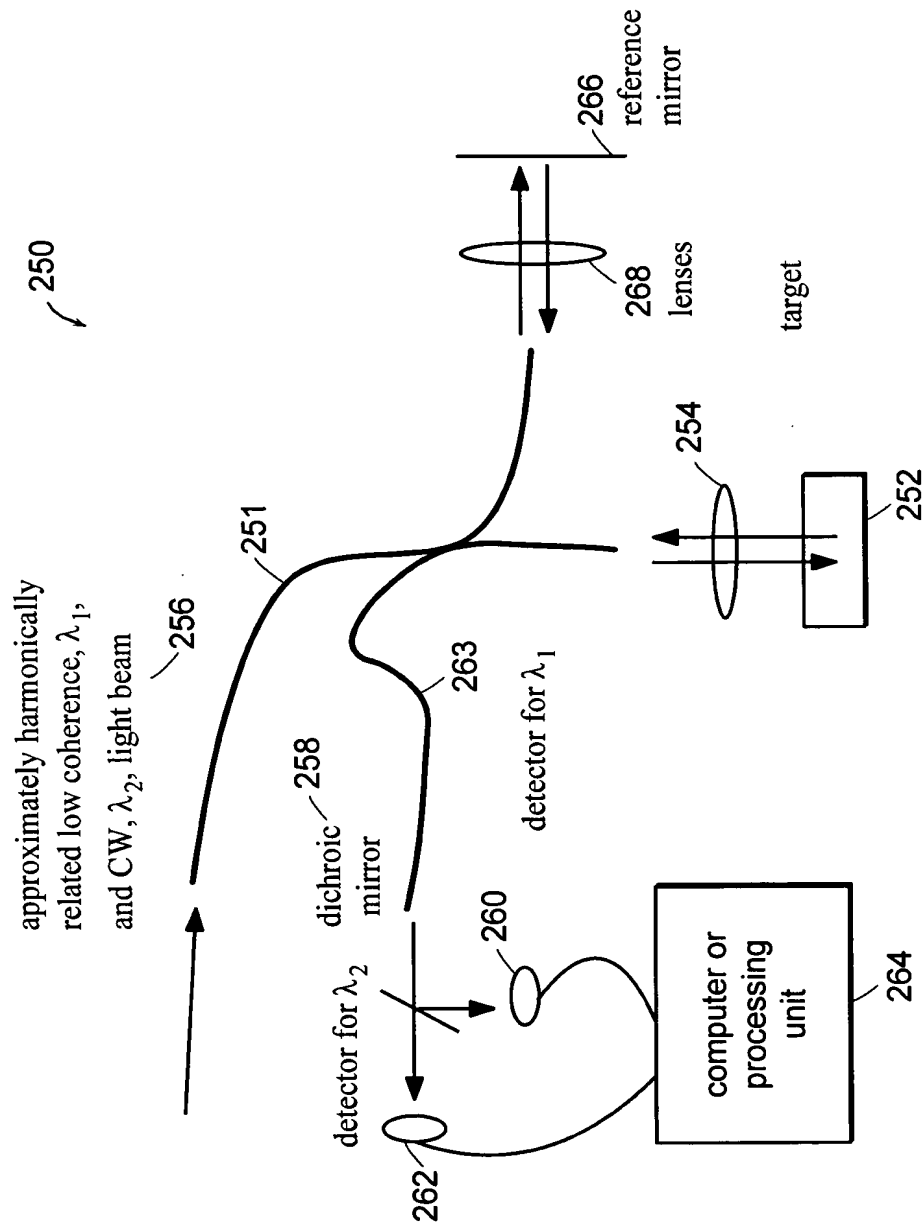


FIG. 9

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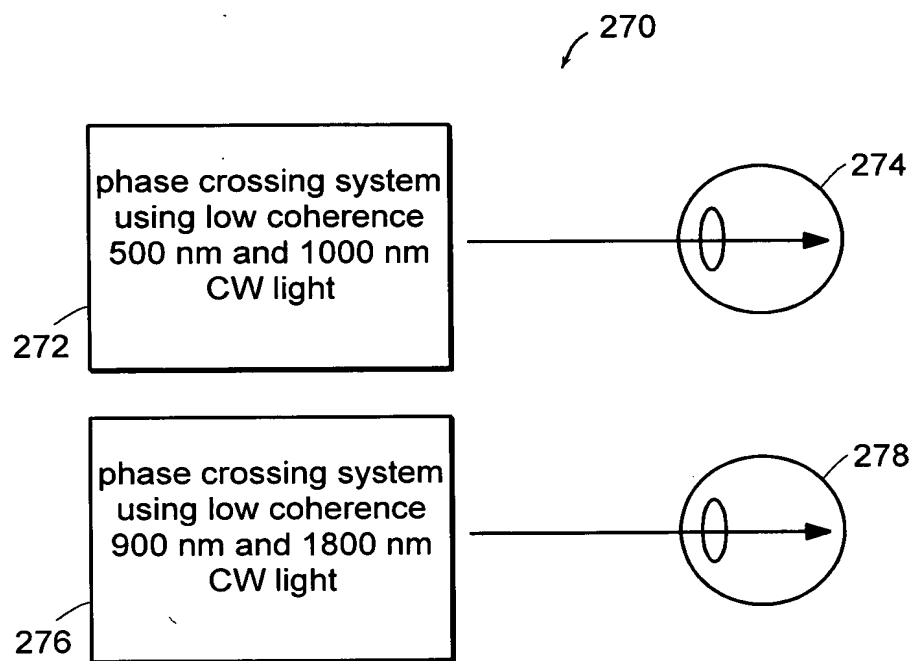


FIG. 10

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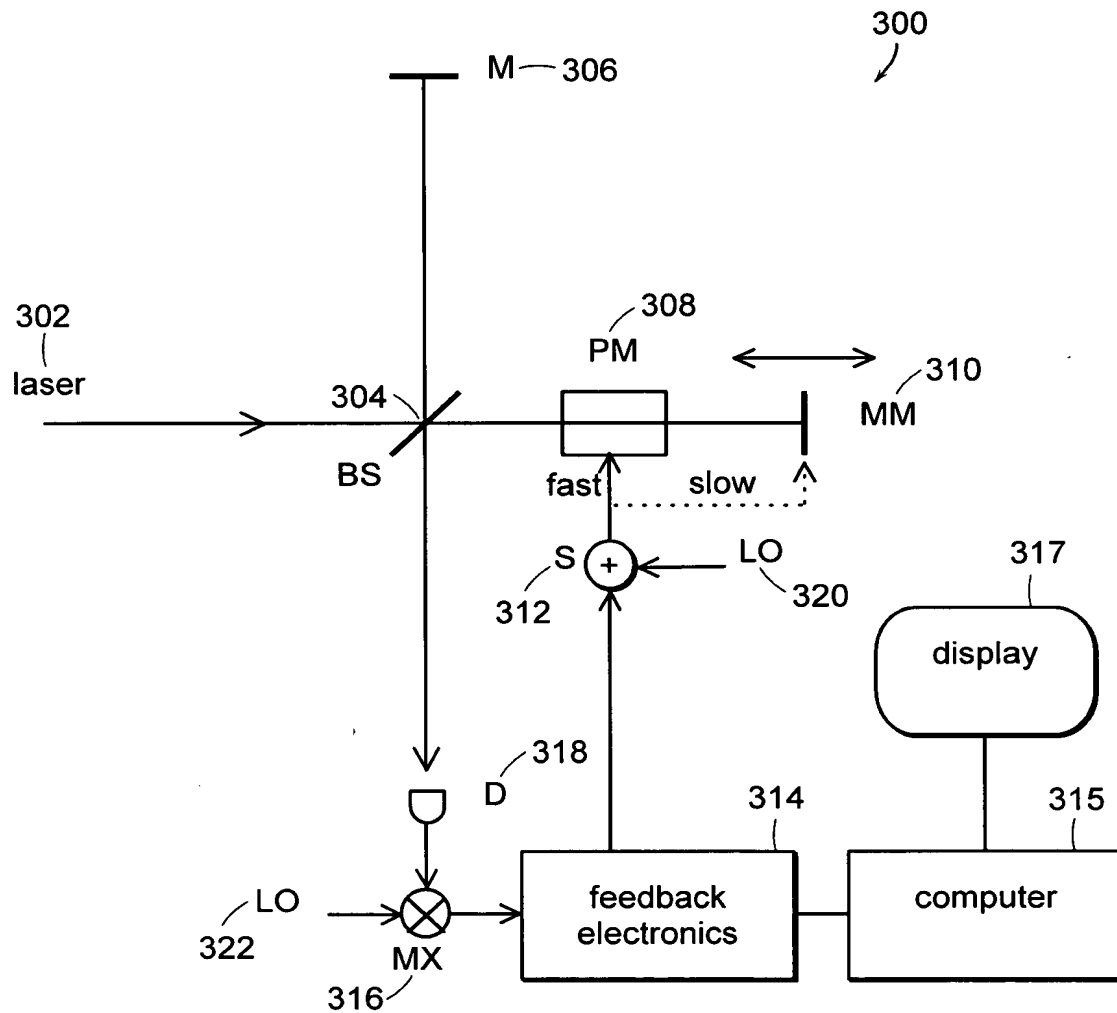


FIG. 11

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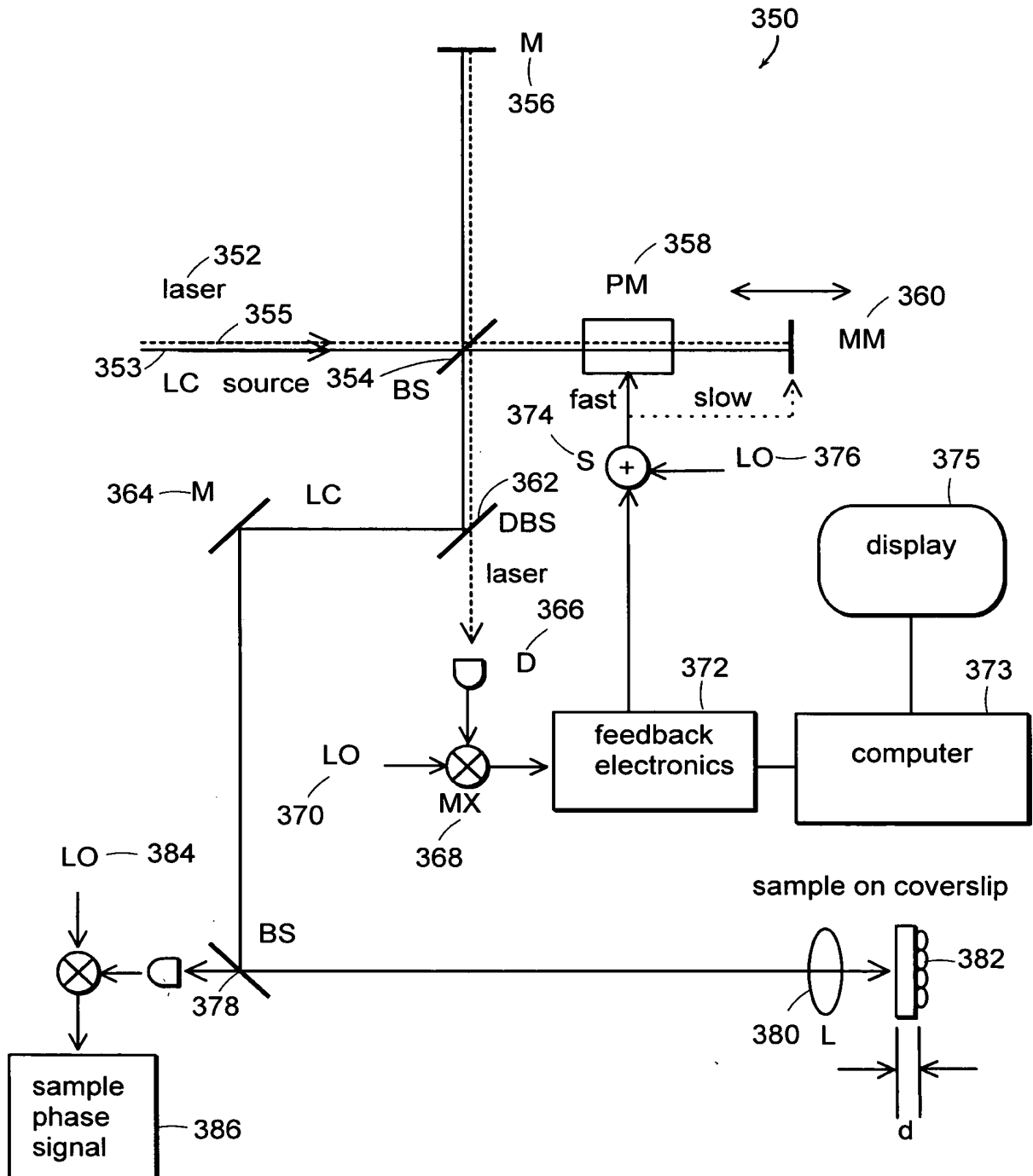


FIG. 12

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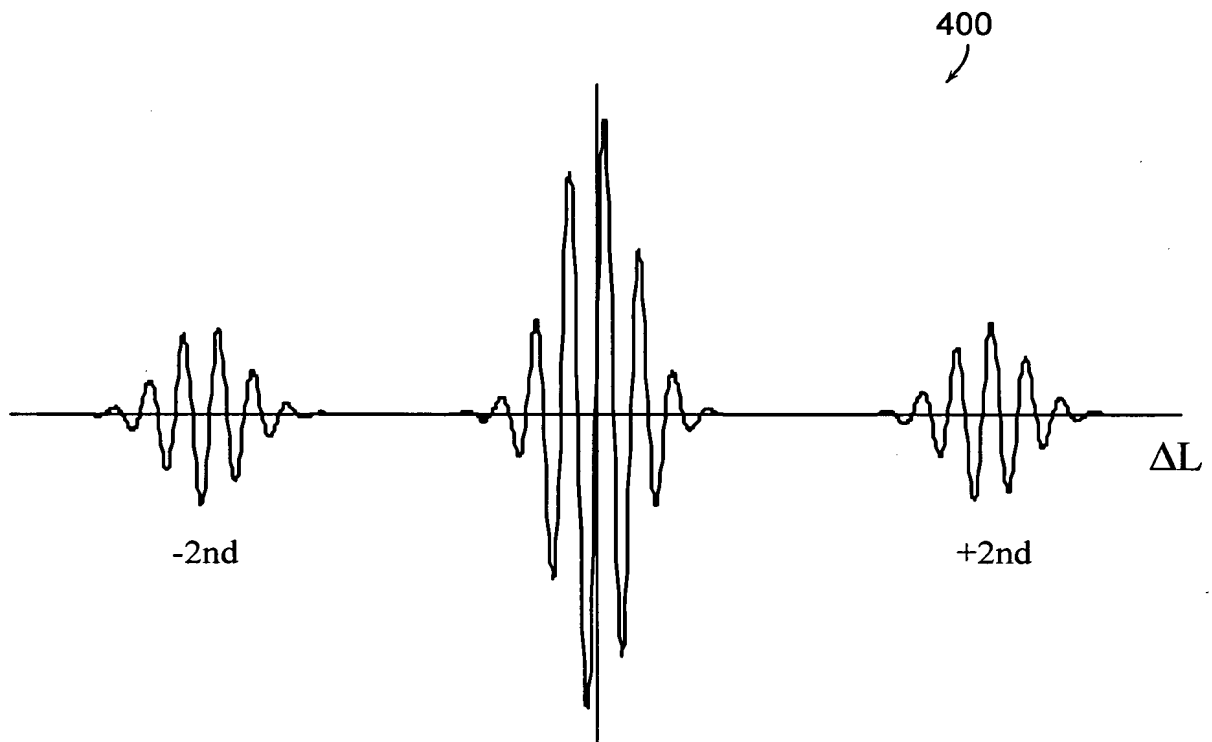


FIG. 13

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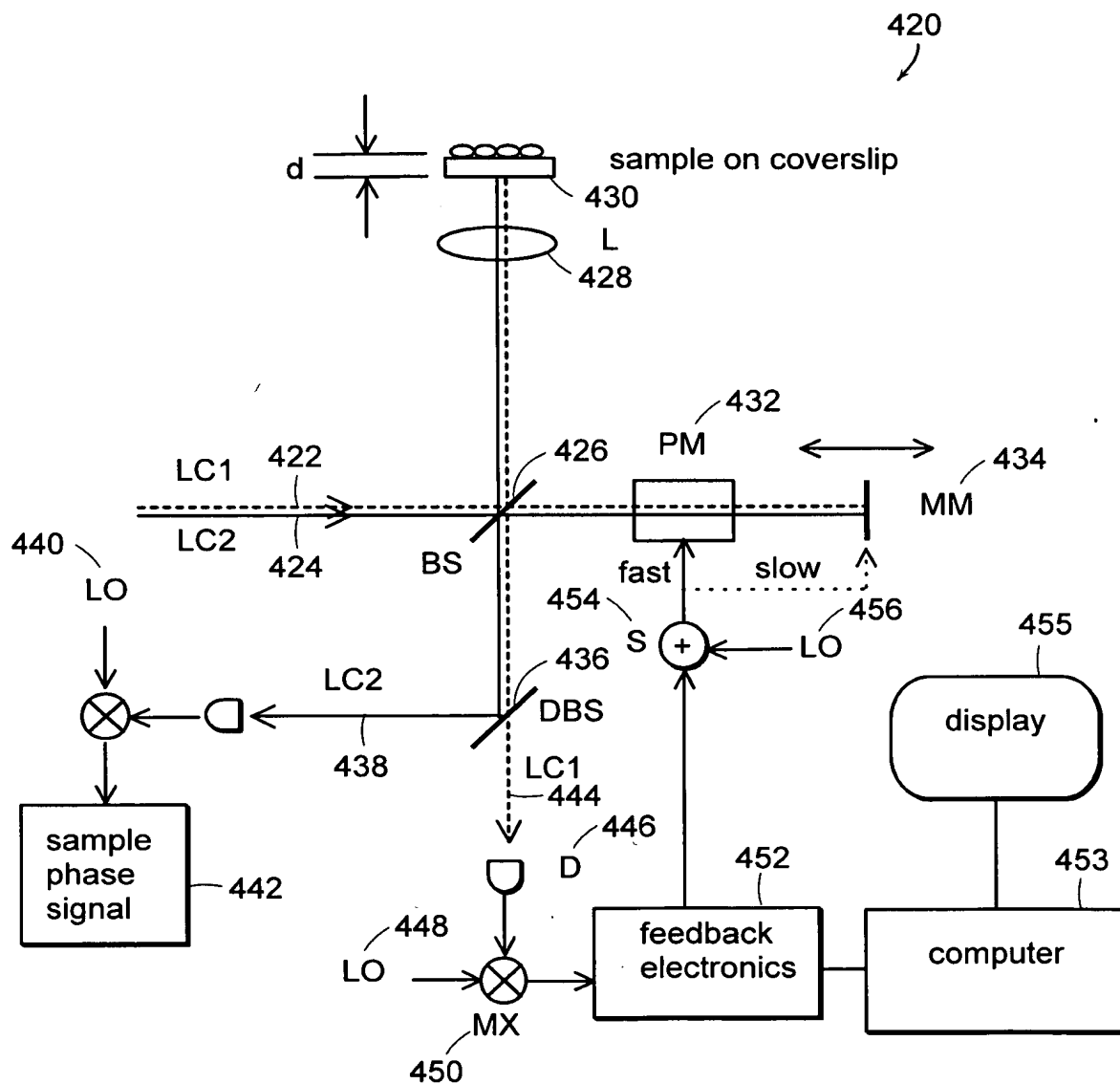


FIG. 14A

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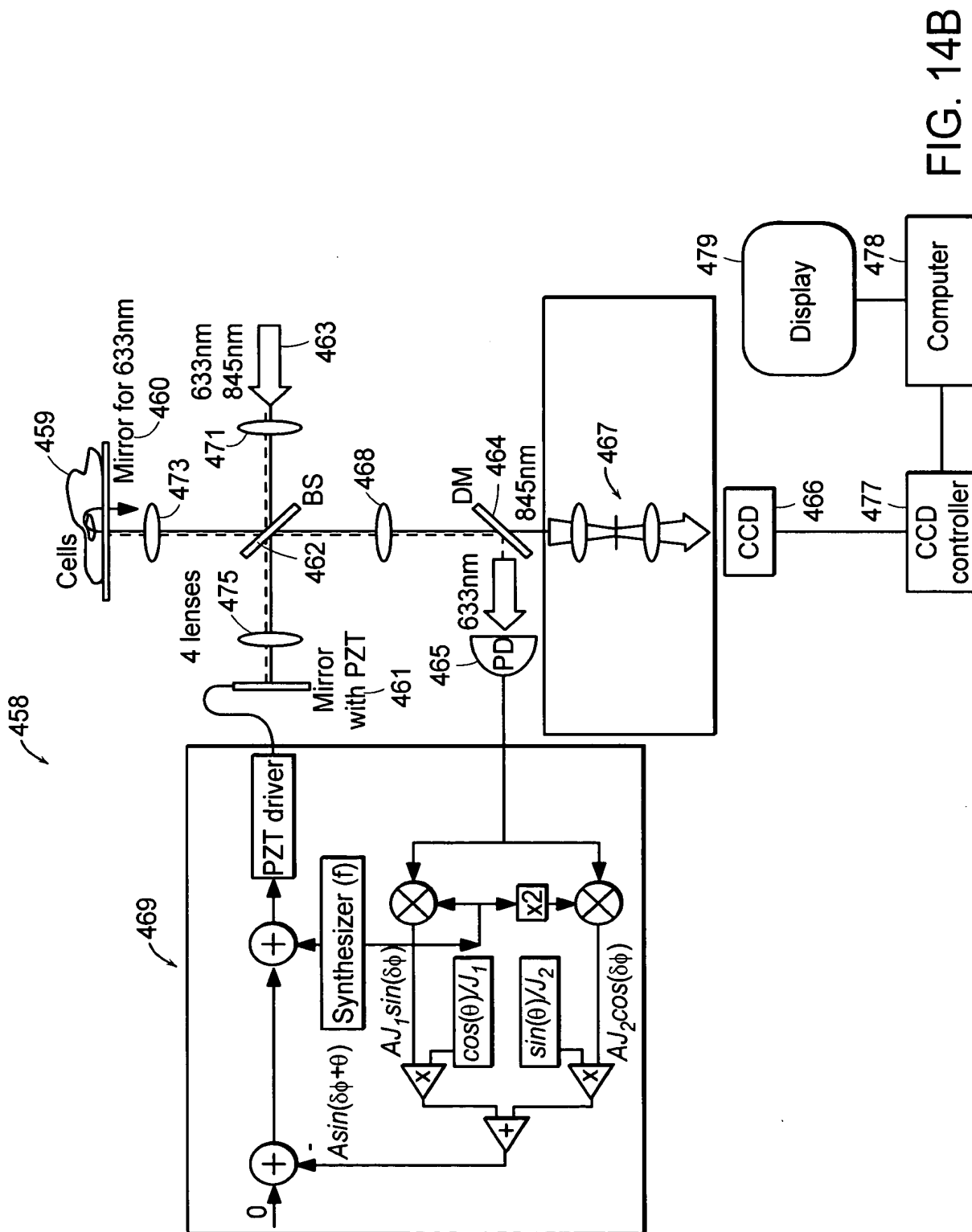
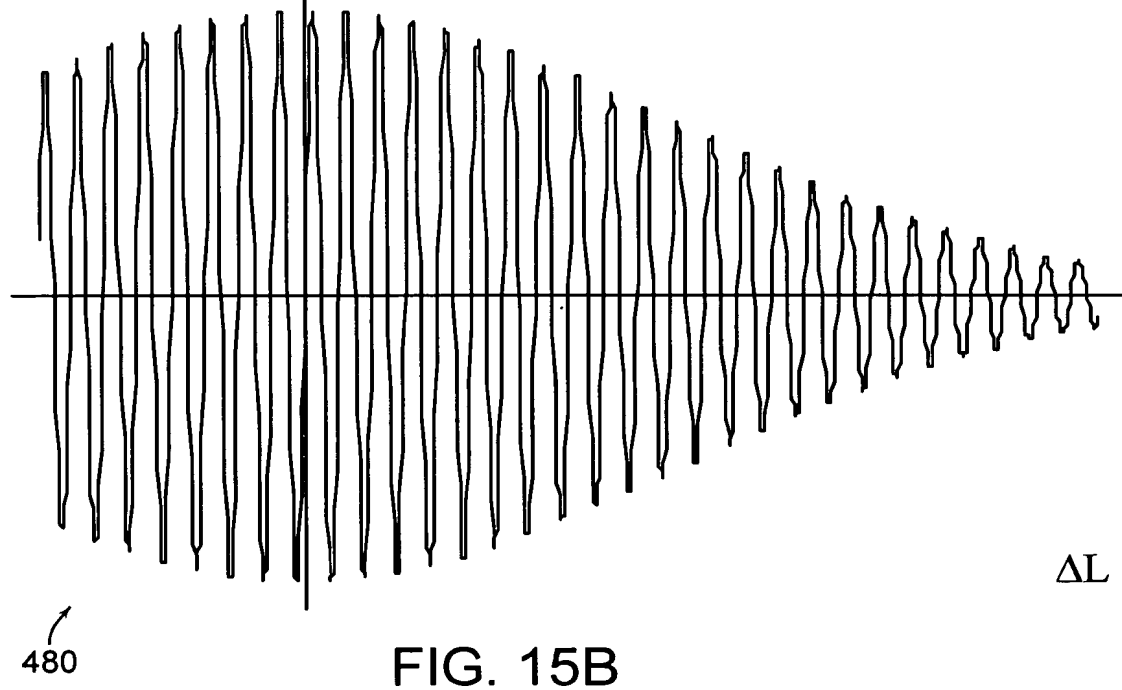
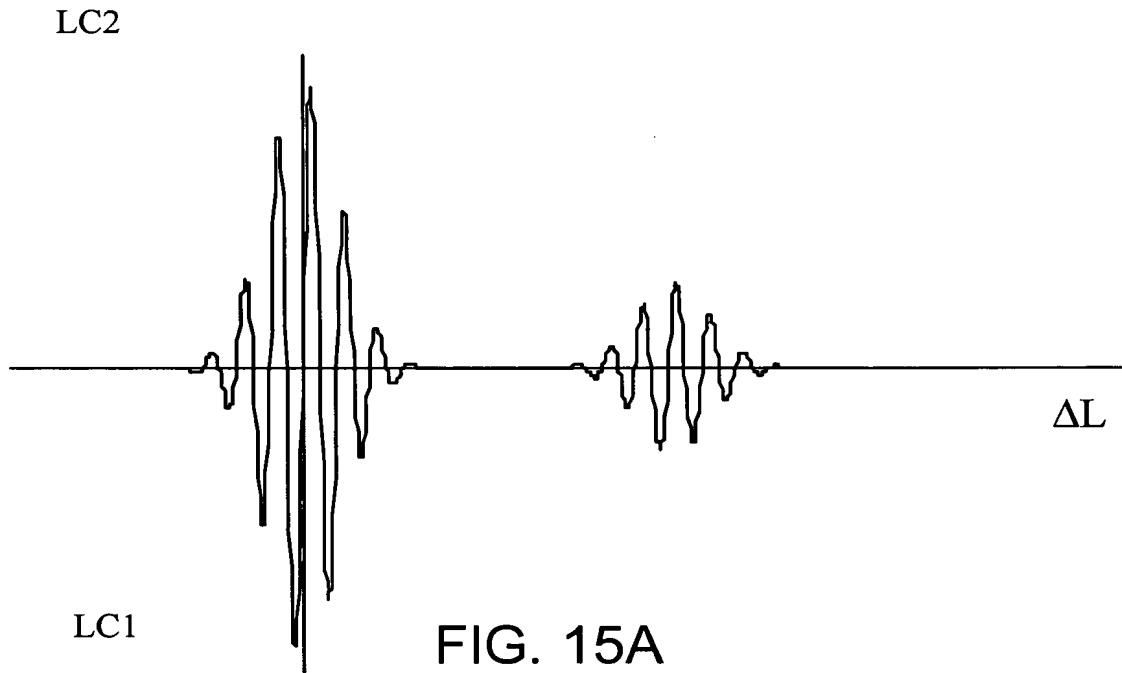


FIG. 14B

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470
↙



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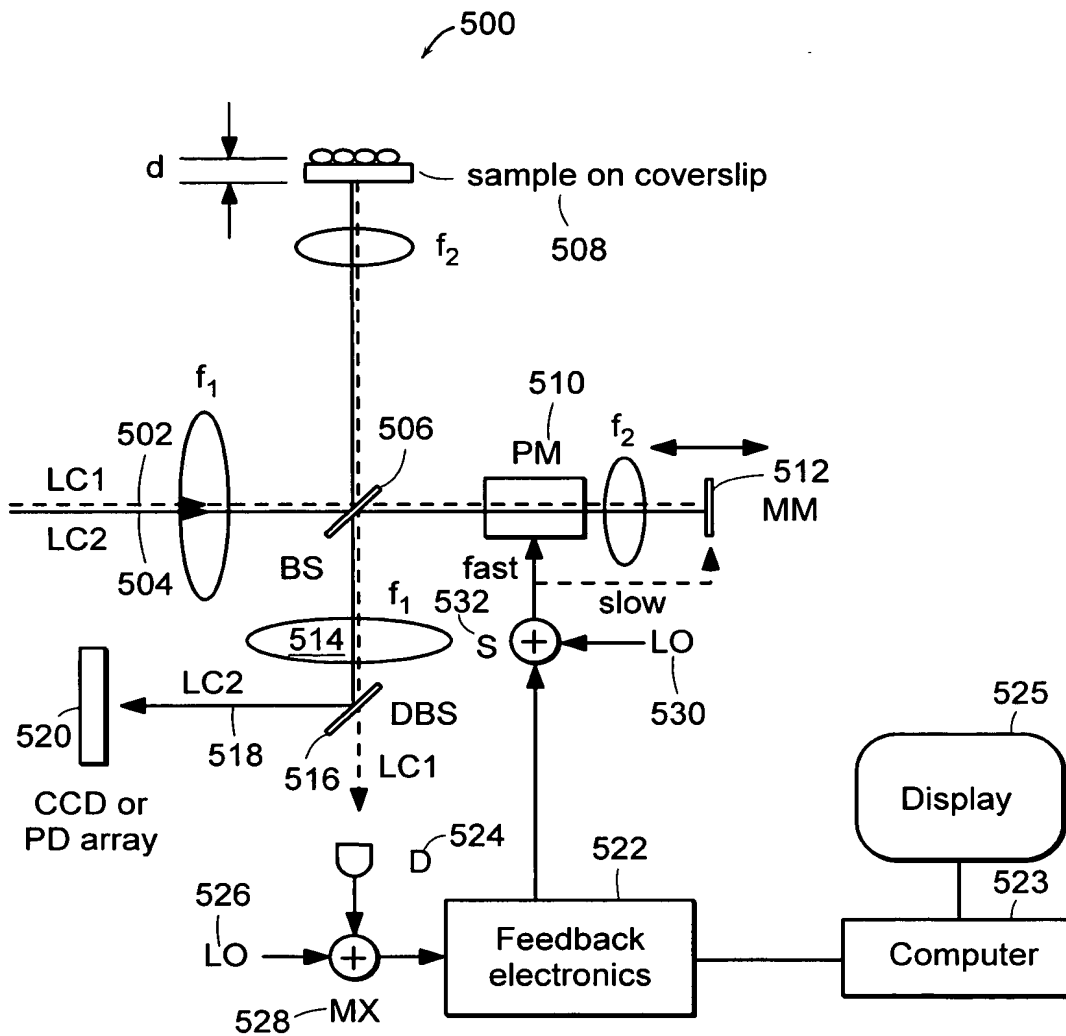


FIG. 16

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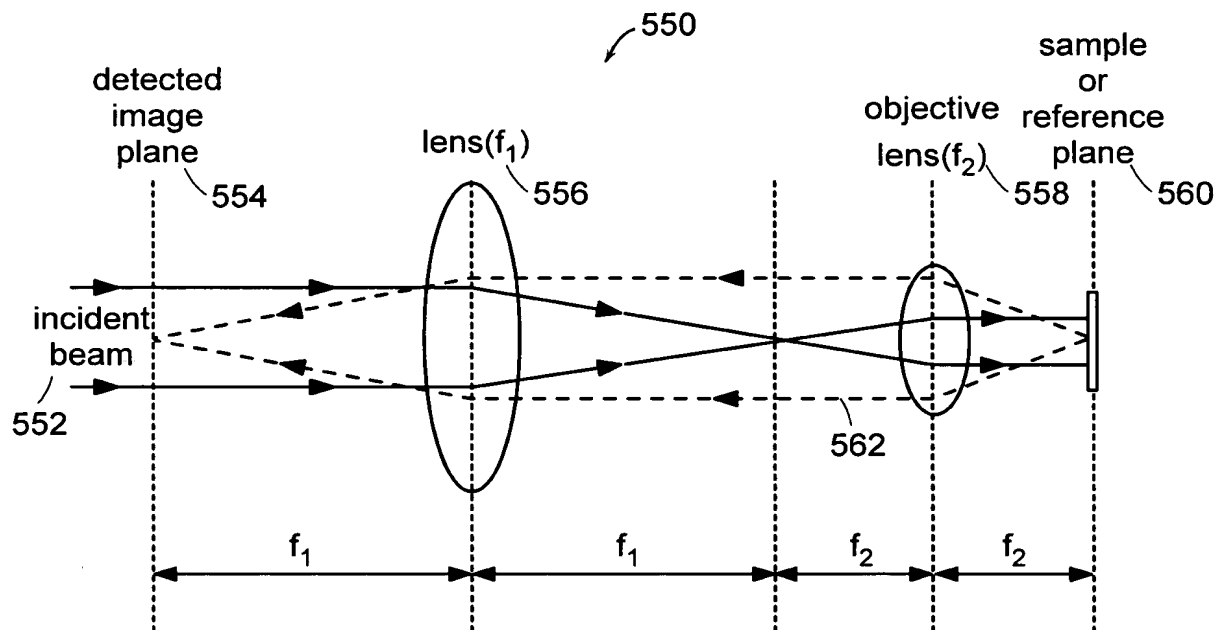


FIG. 17

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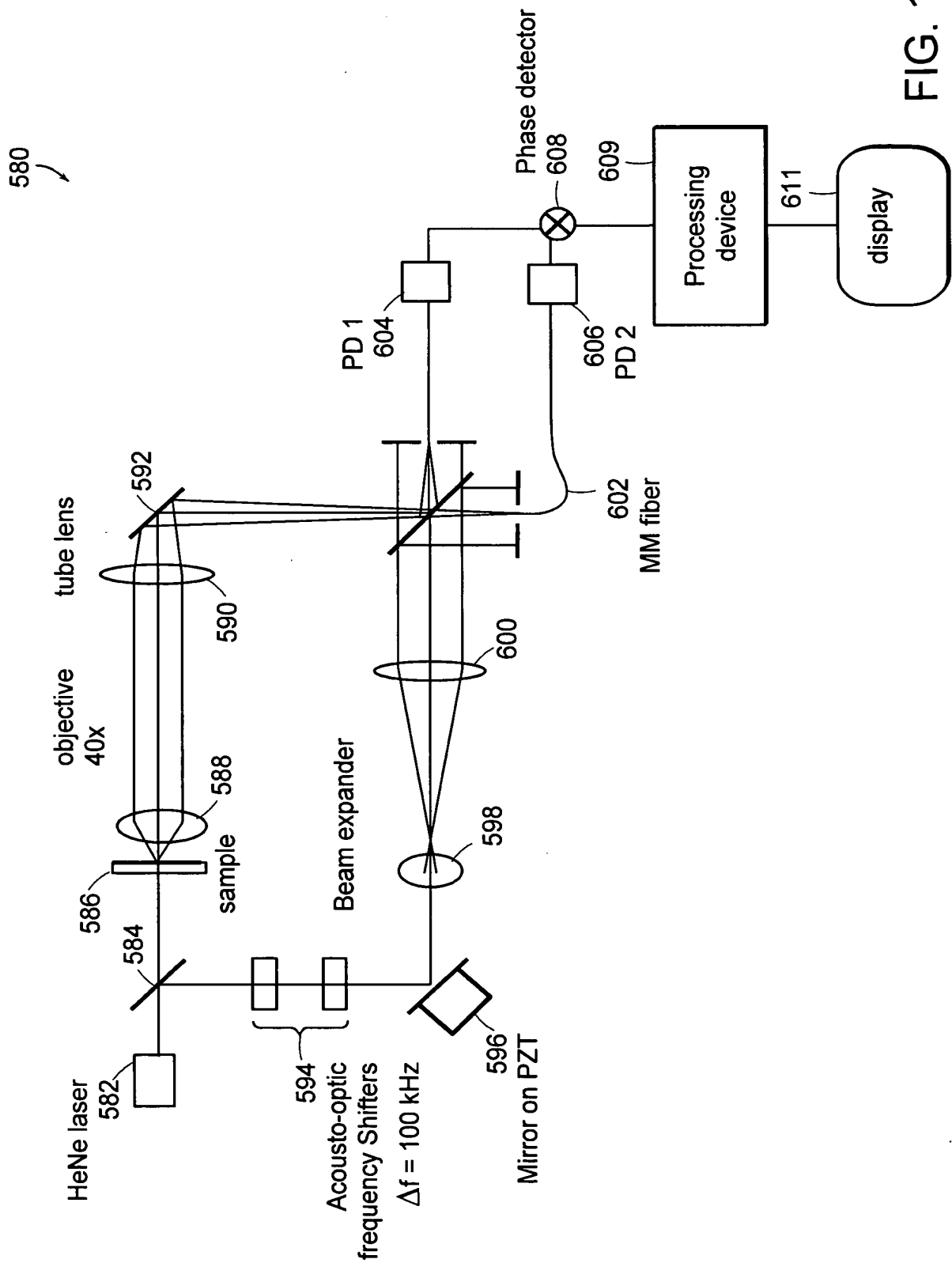


FIG. 18A

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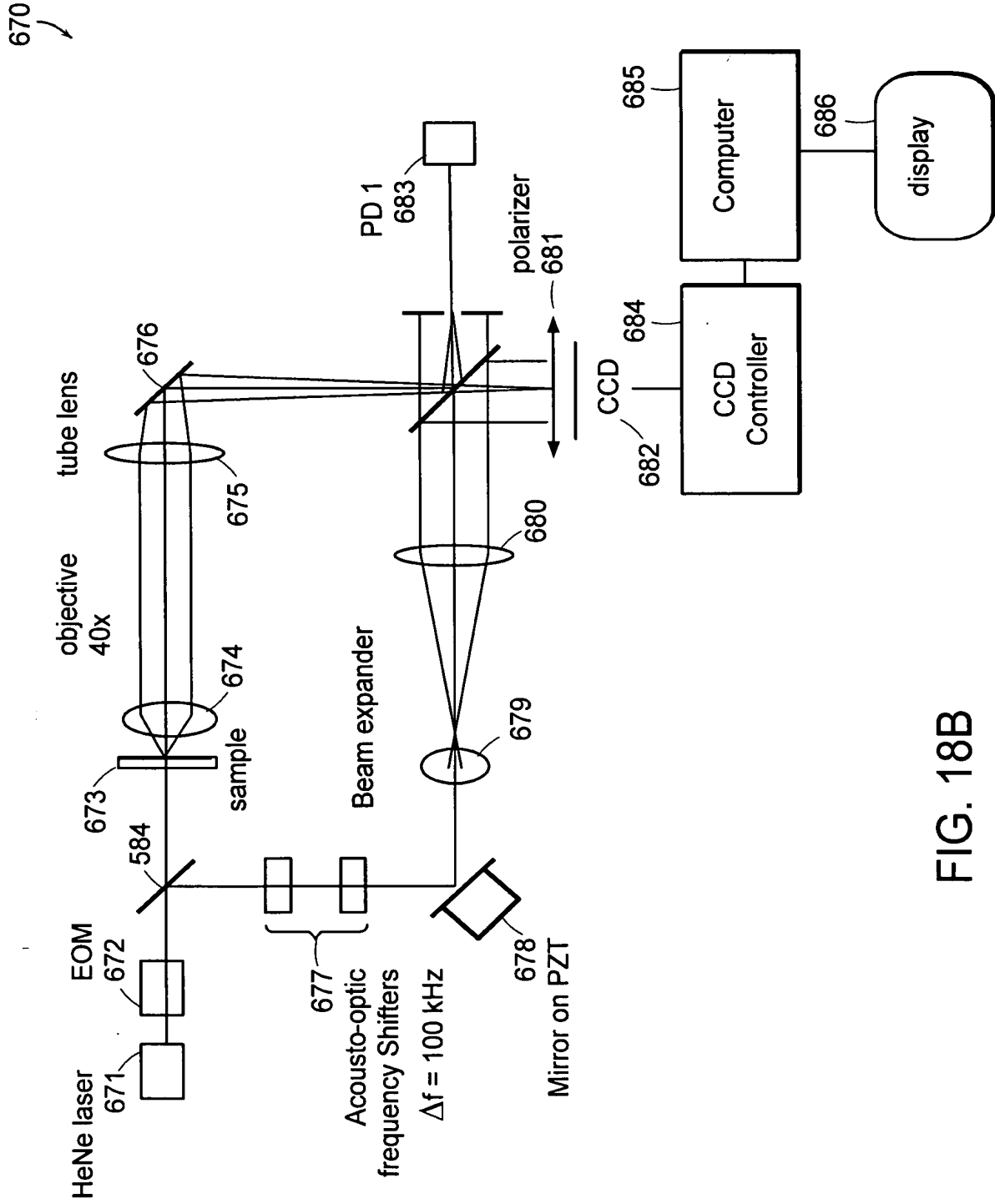


FIG. 18B

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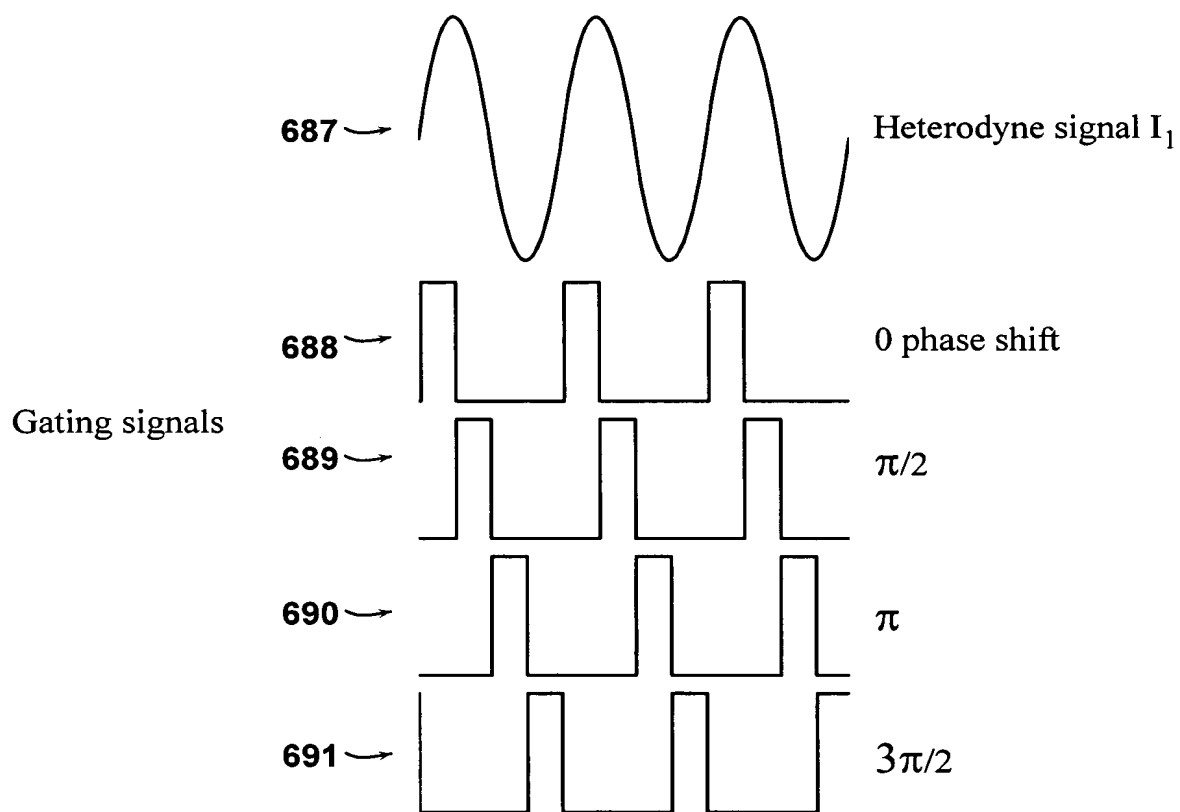


FIG. 18C

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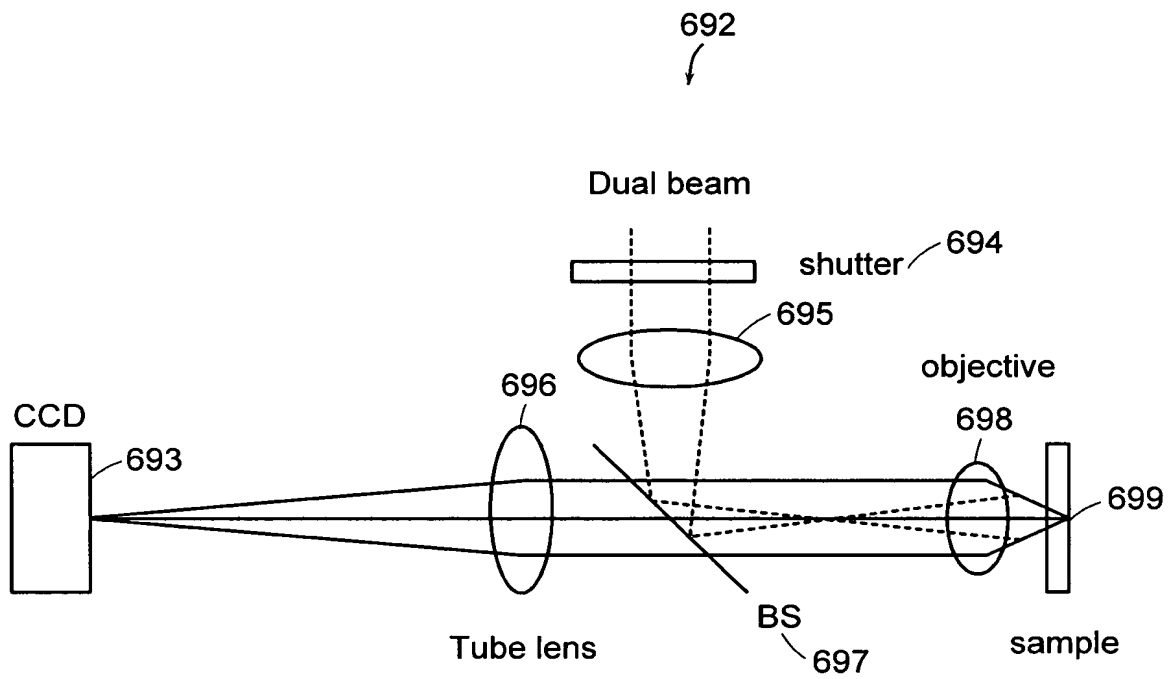


FIG. 18D

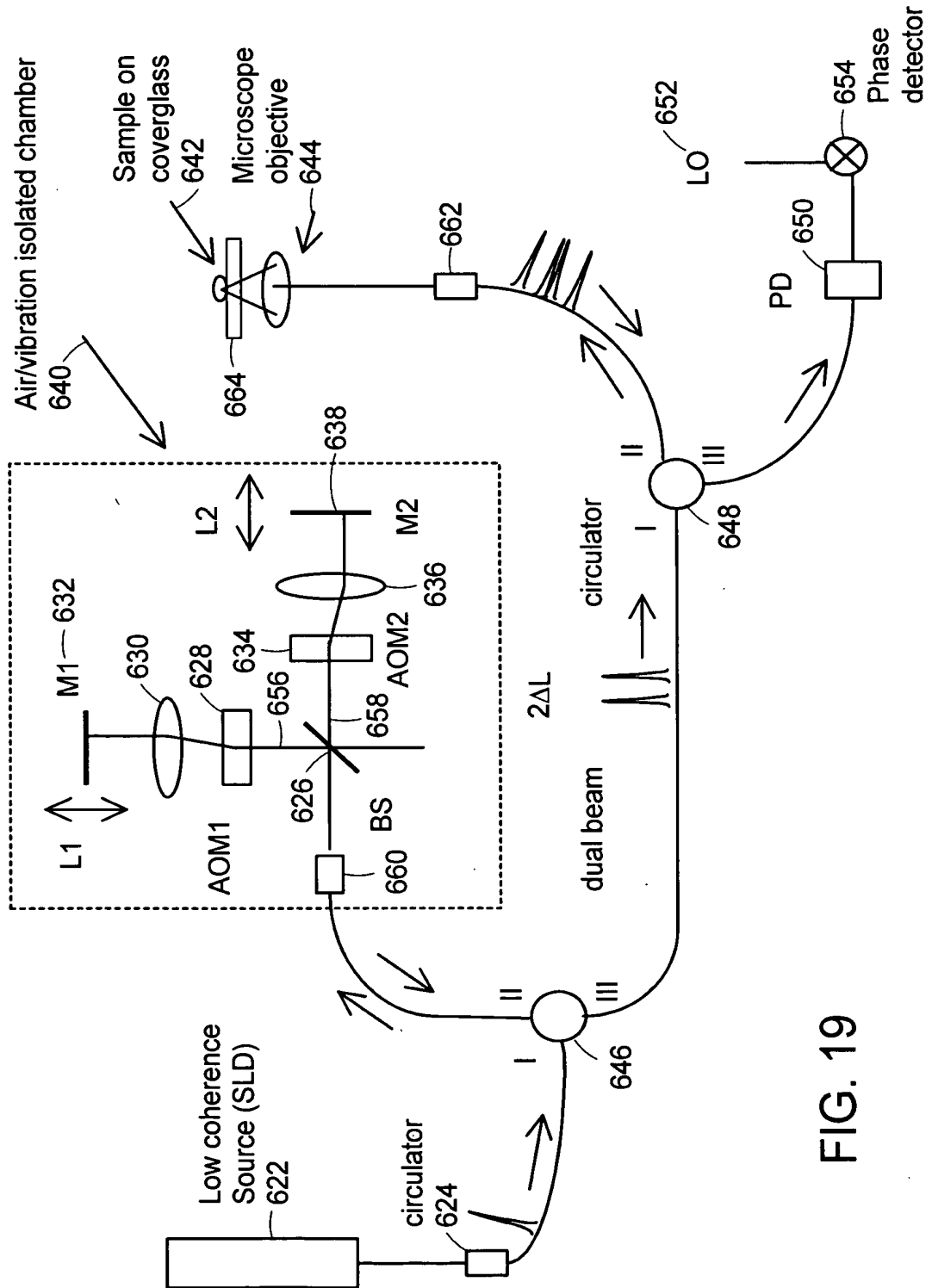
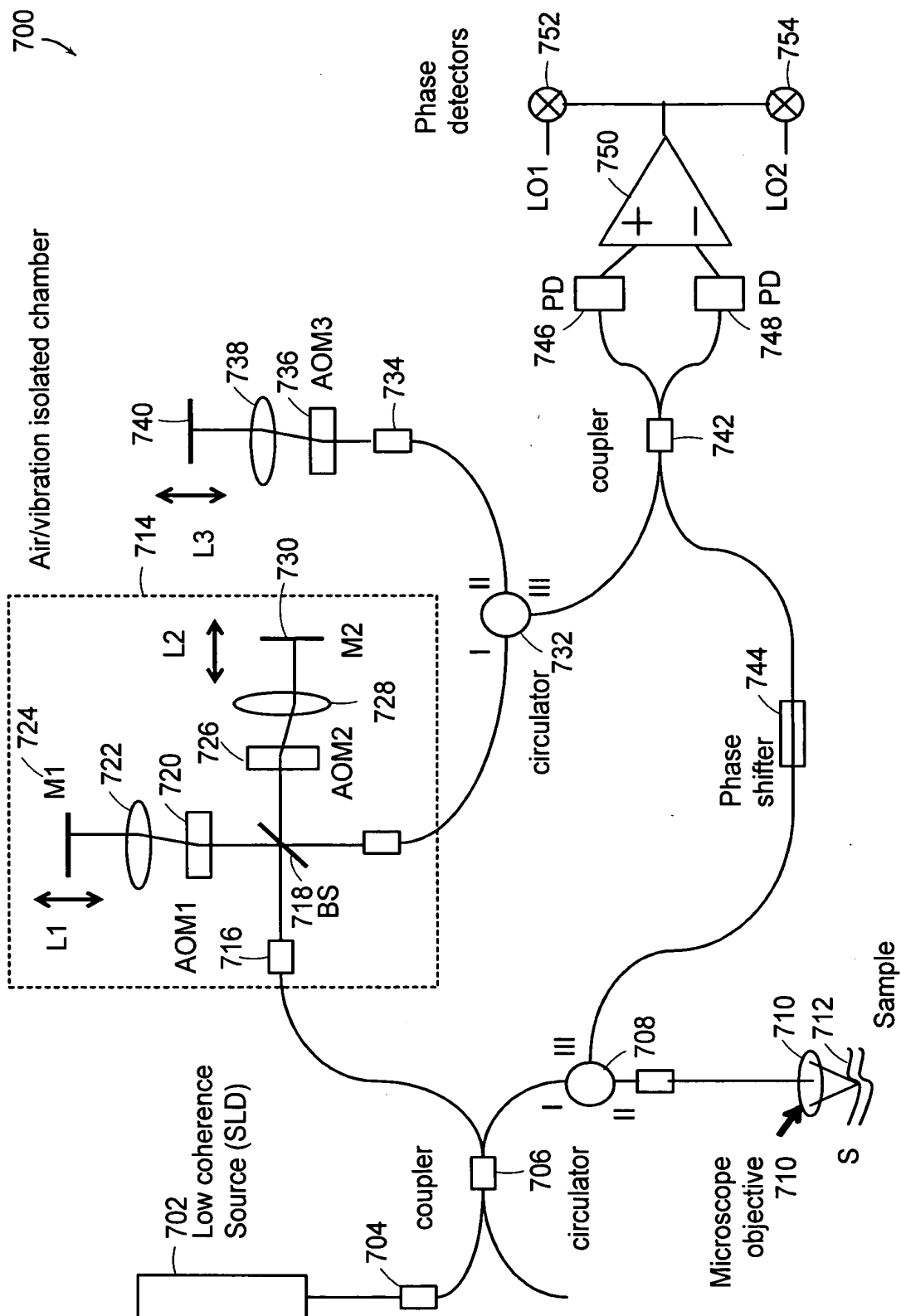


FIG. 19



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760

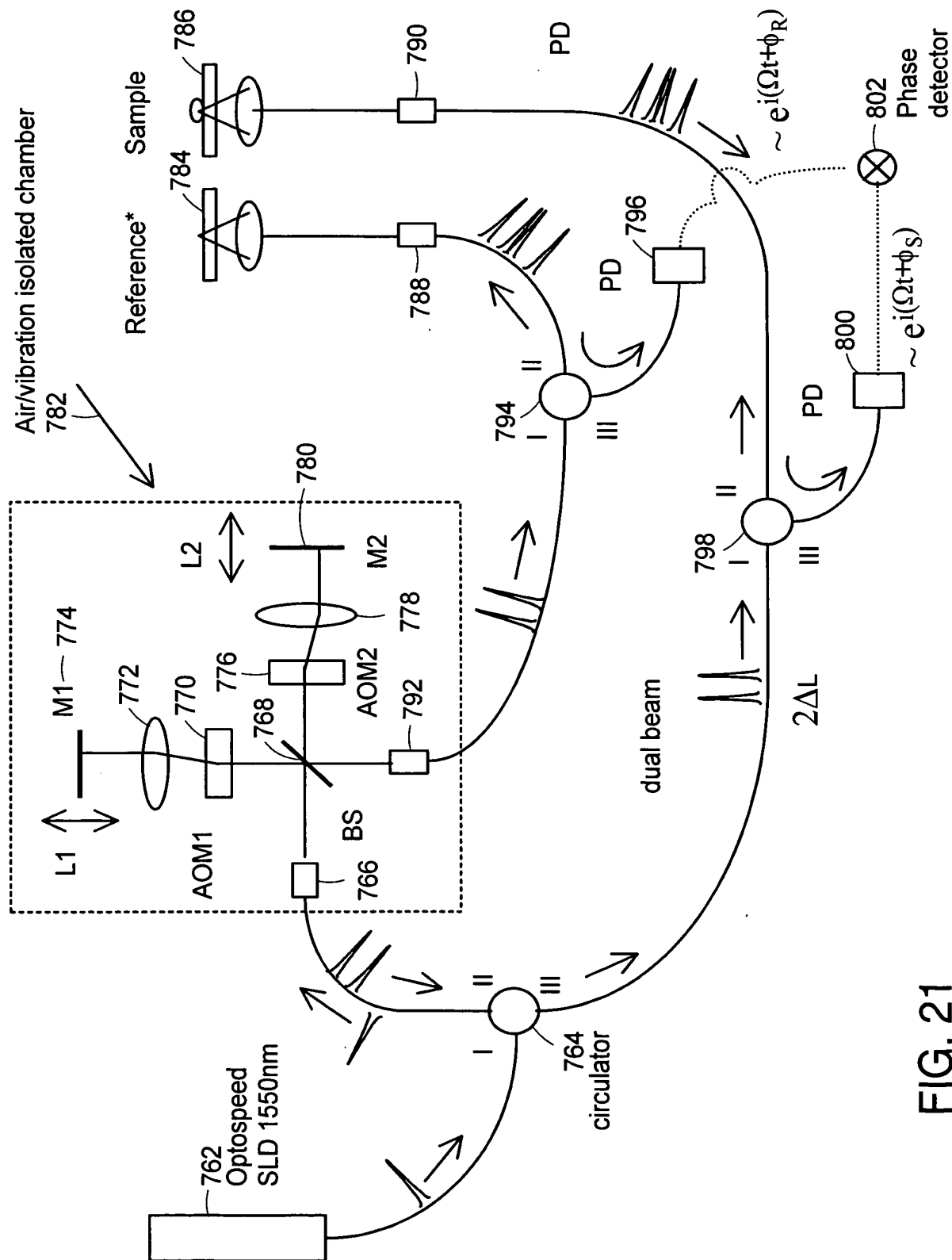


FIG. 21

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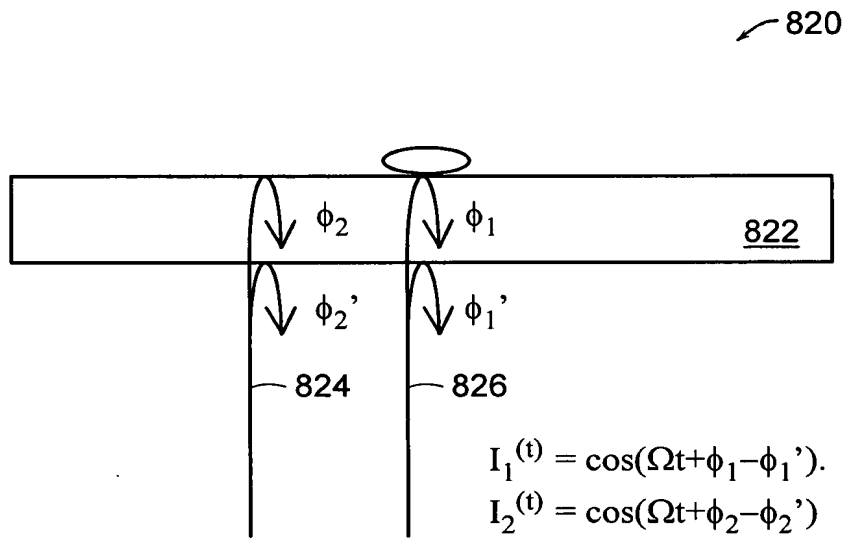


FIG. 22

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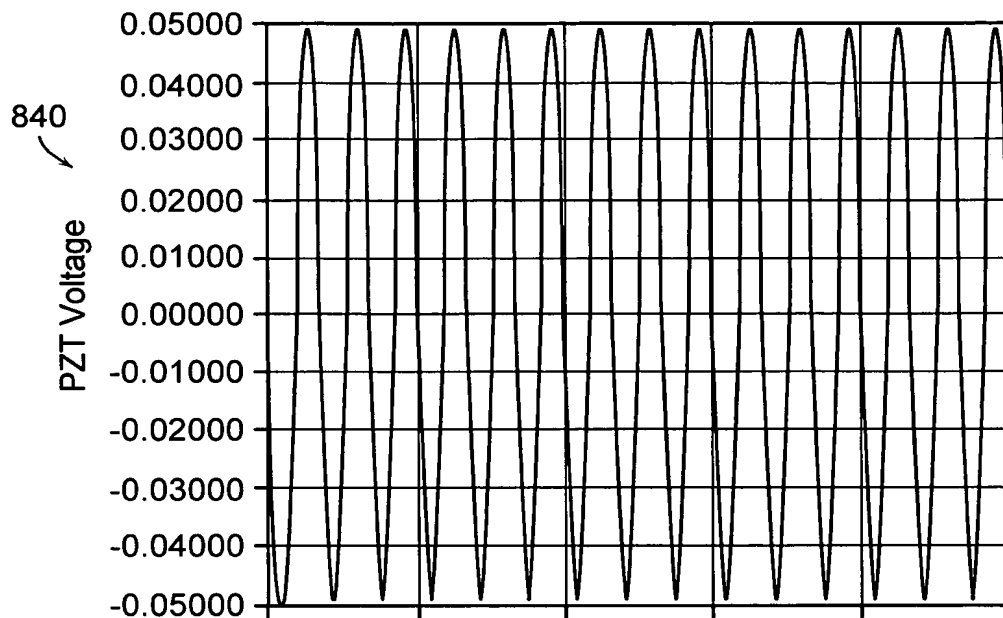


FIG. 23A

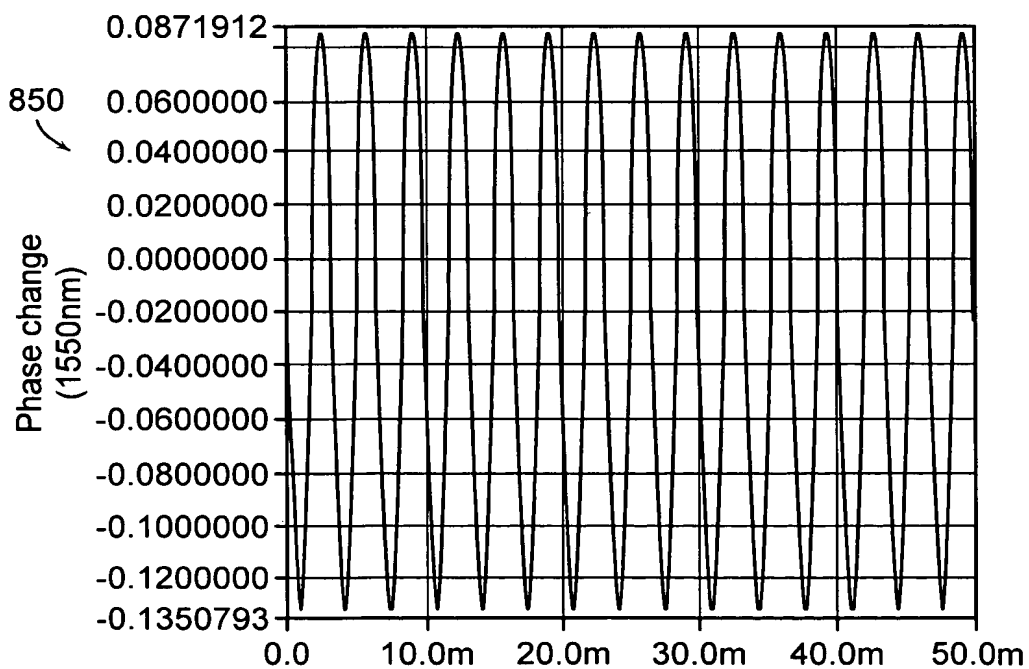


FIG. 23B

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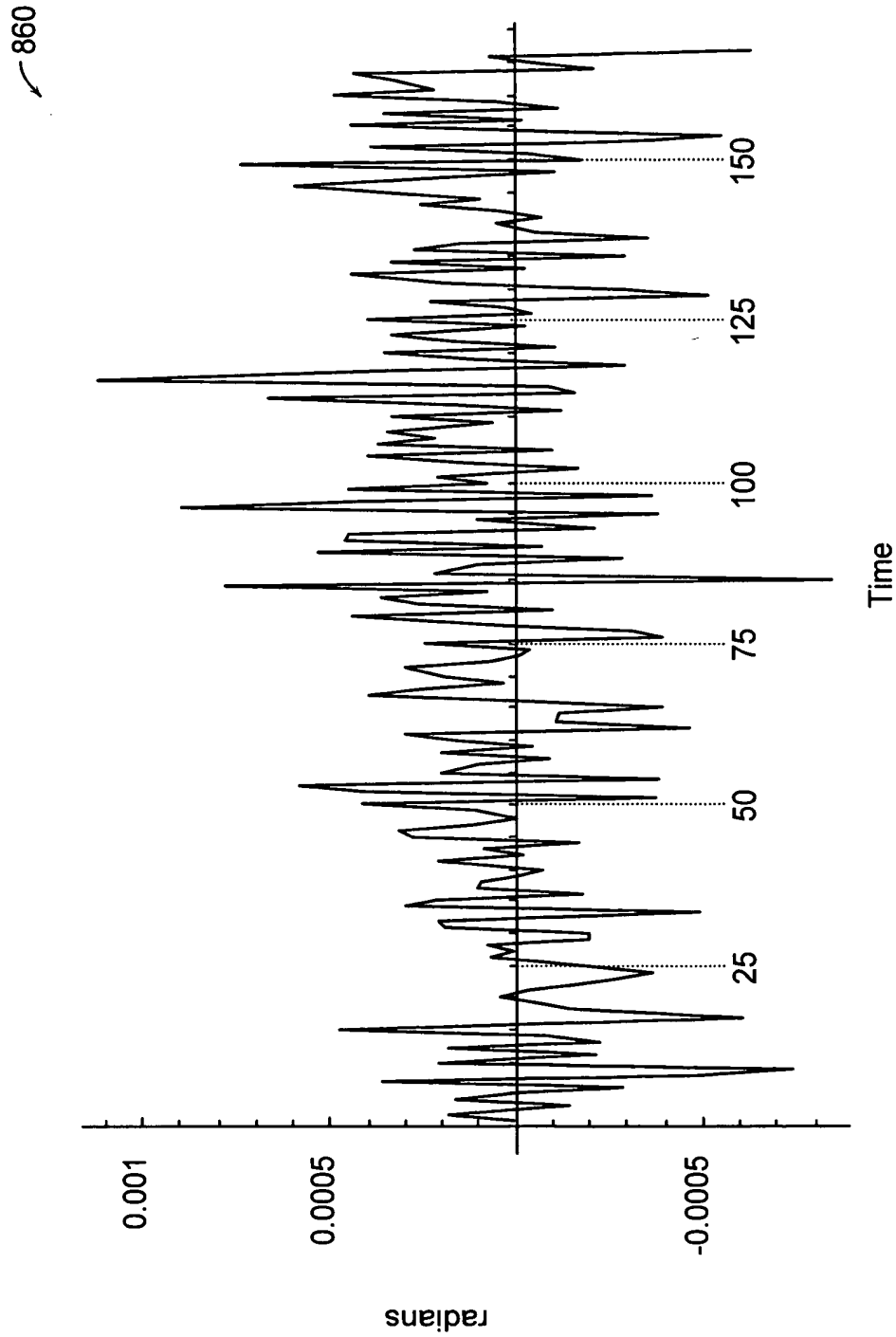


FIG. 24

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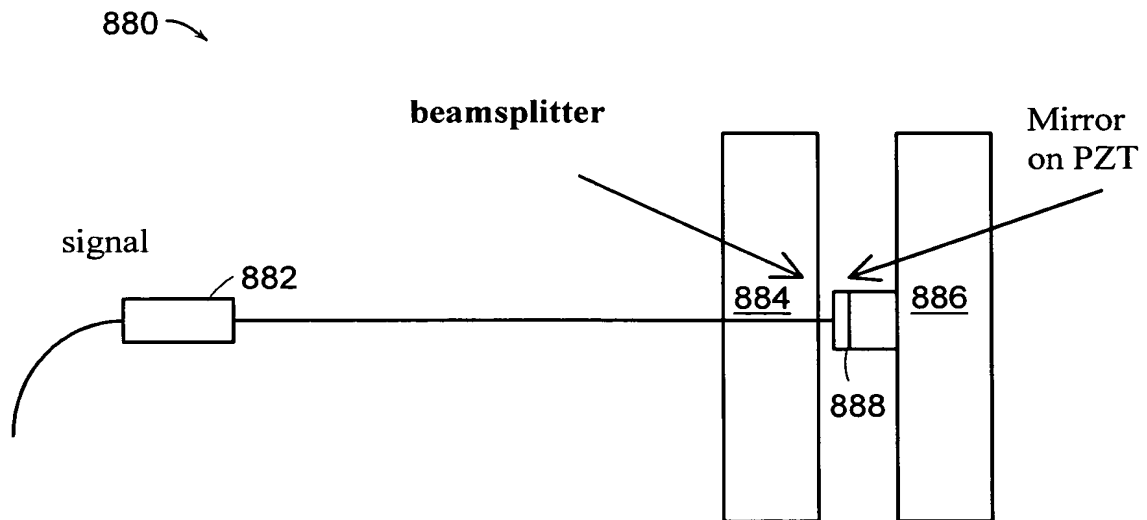


FIG. 25A

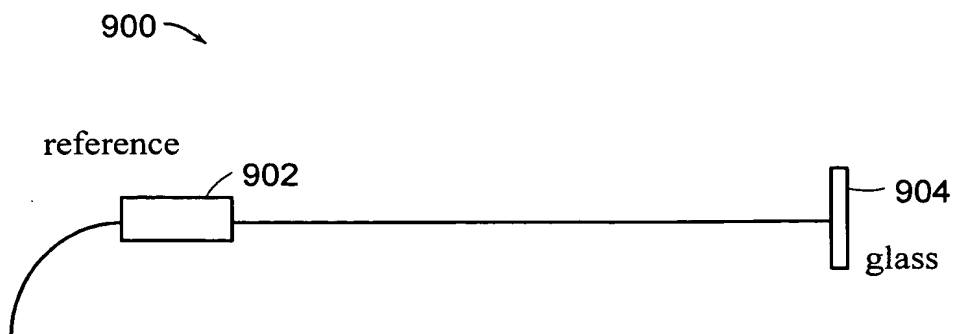


FIG. 25B

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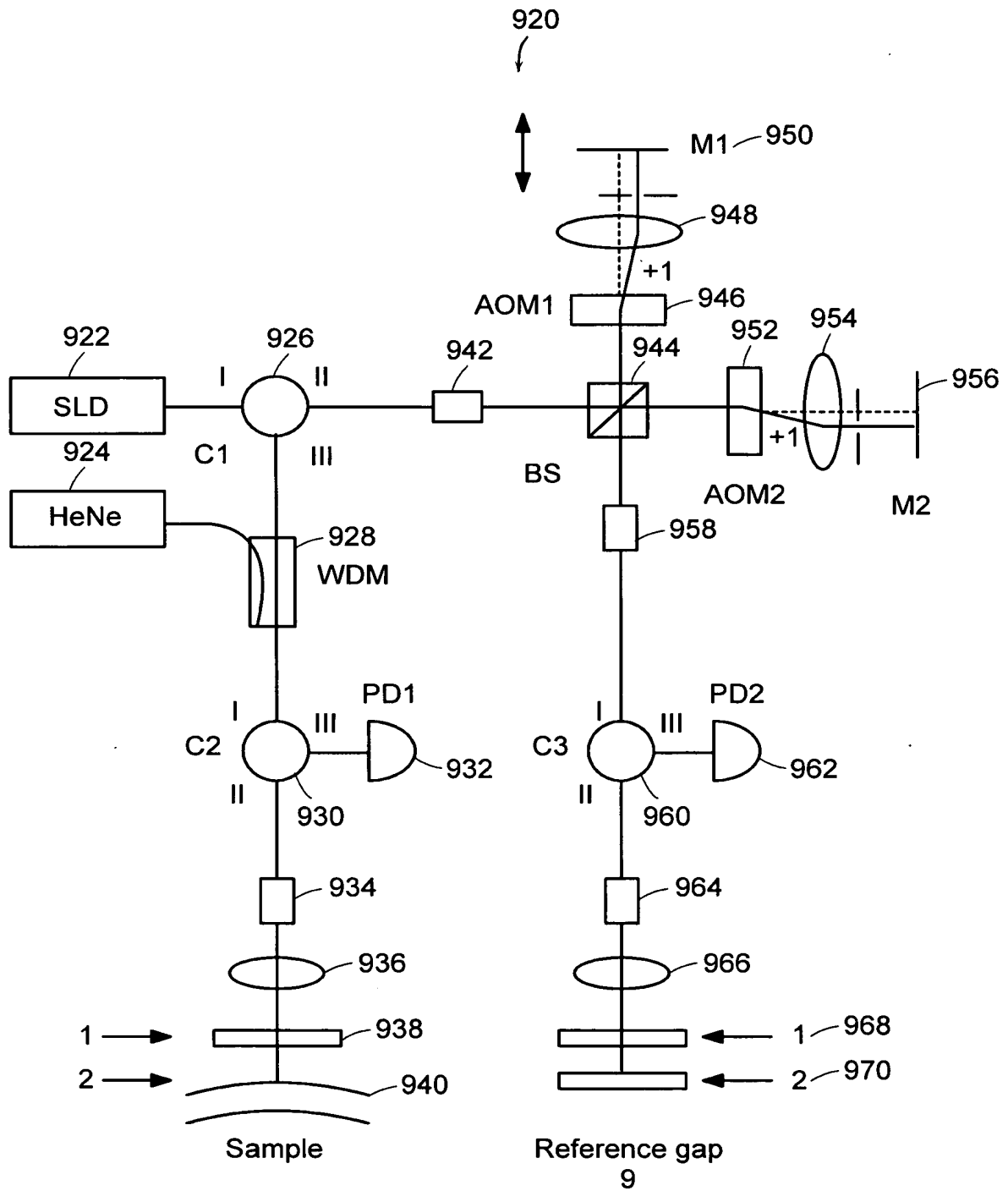


FIG. 26

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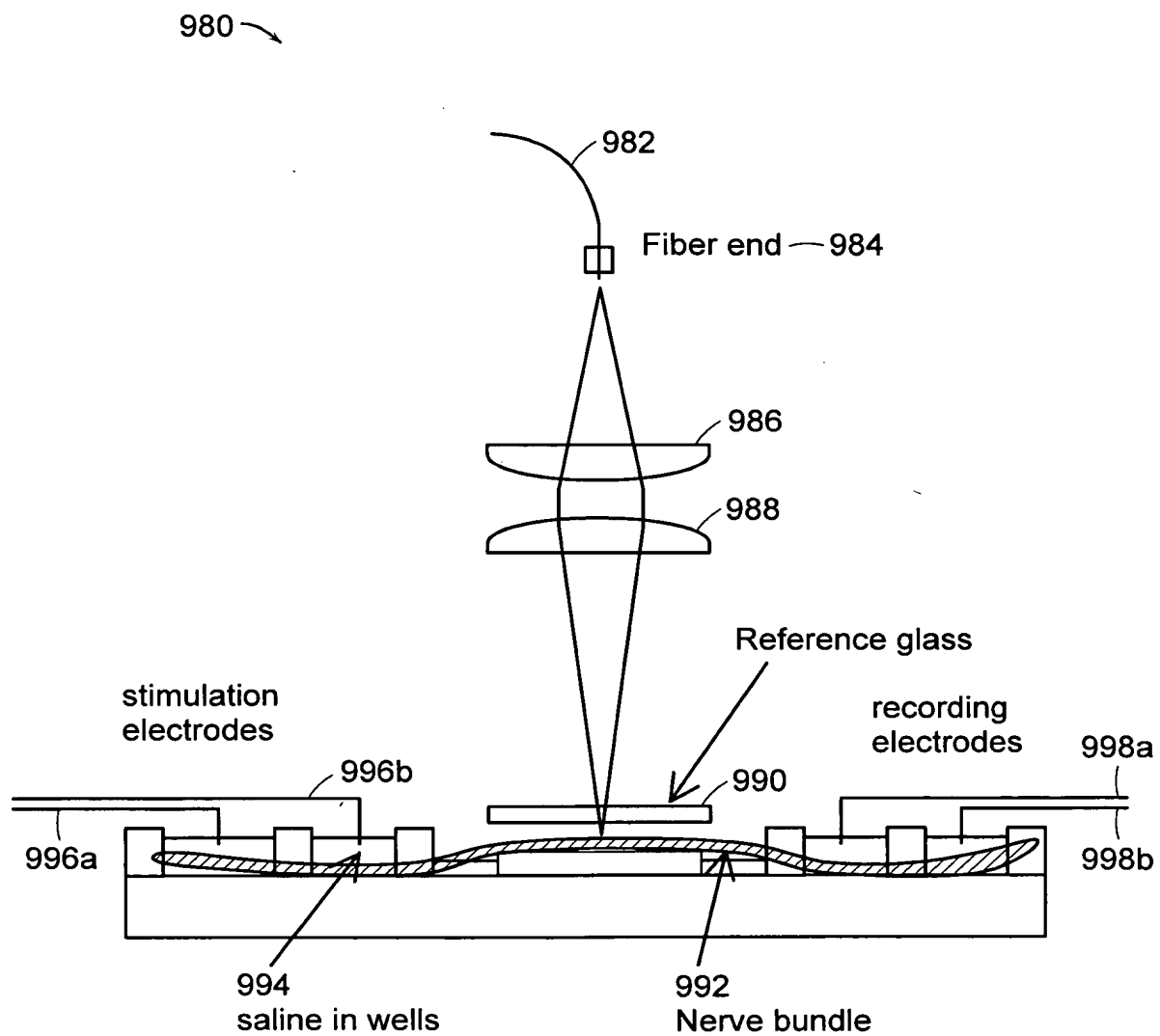


FIG. 27

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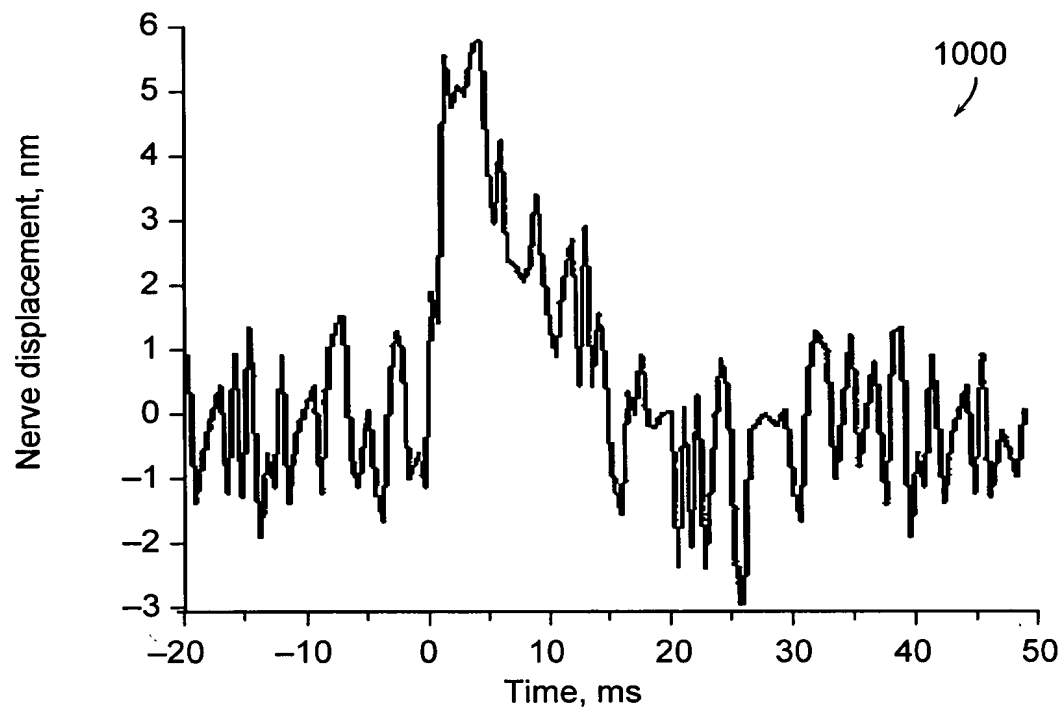


FIG. 28A

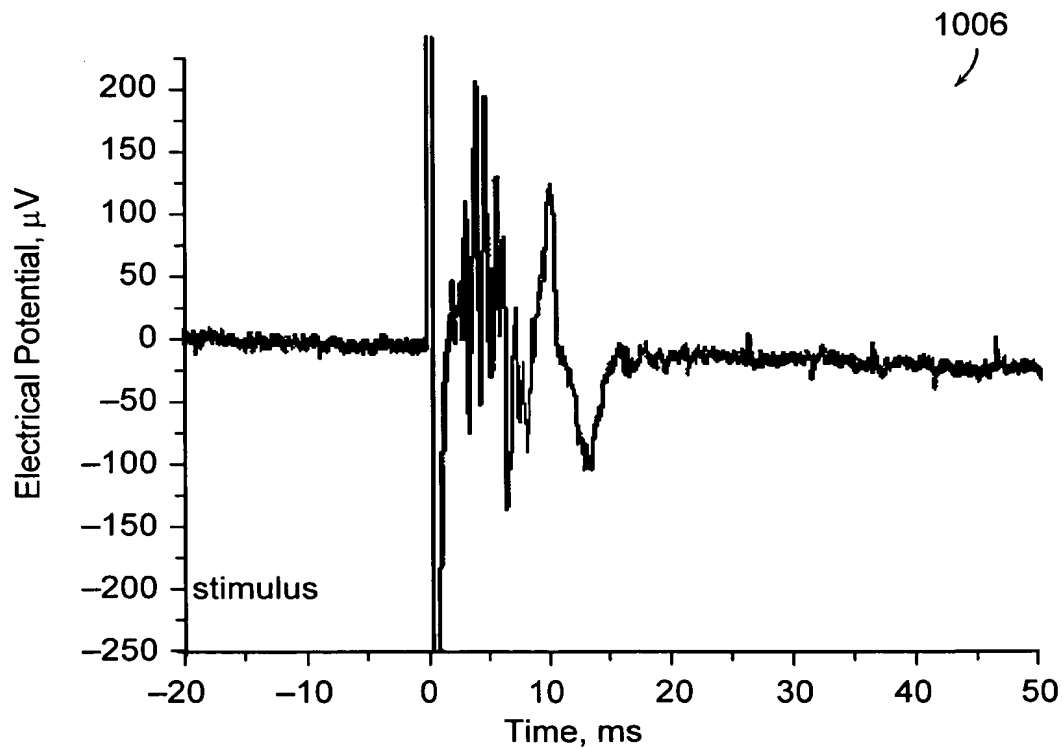


FIG. 28B

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1010

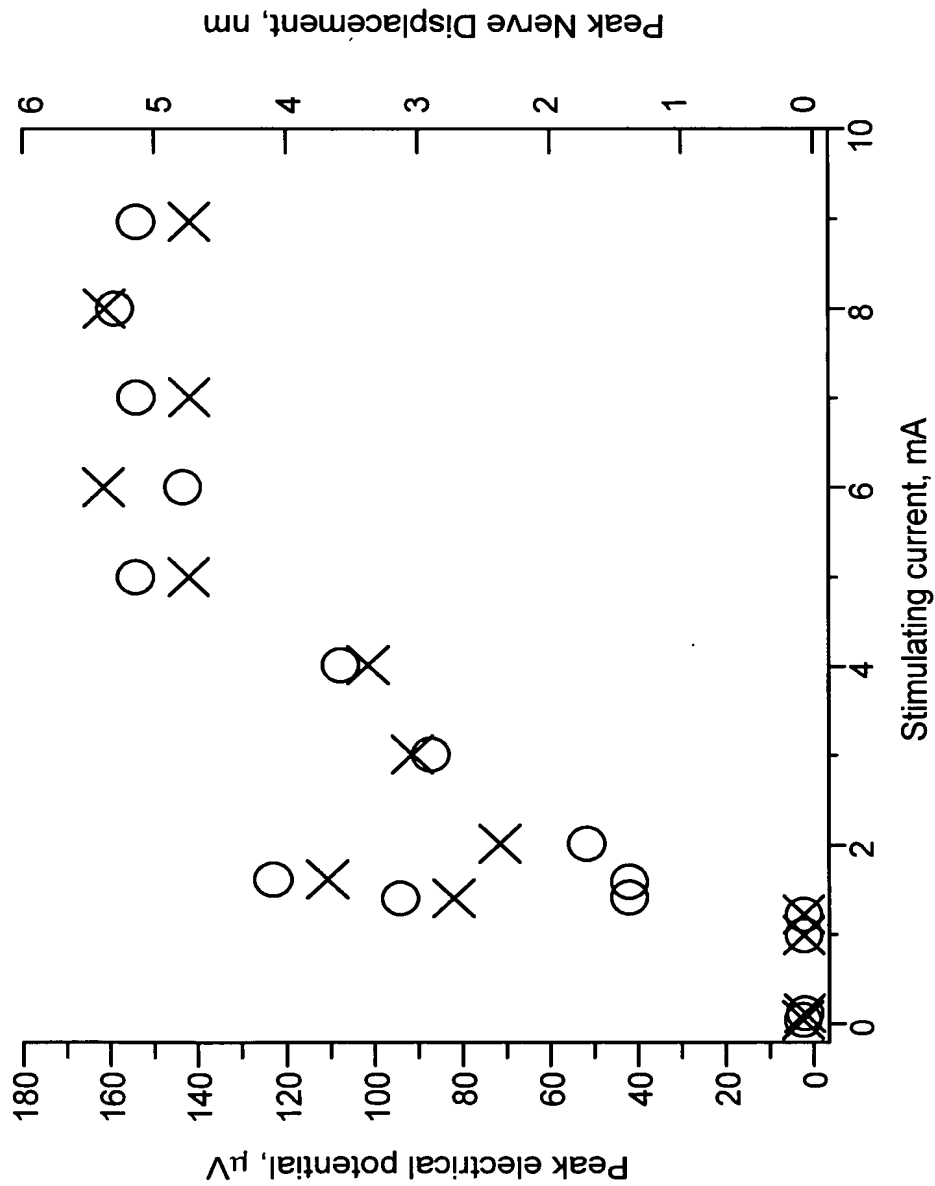


FIG. 29

1020

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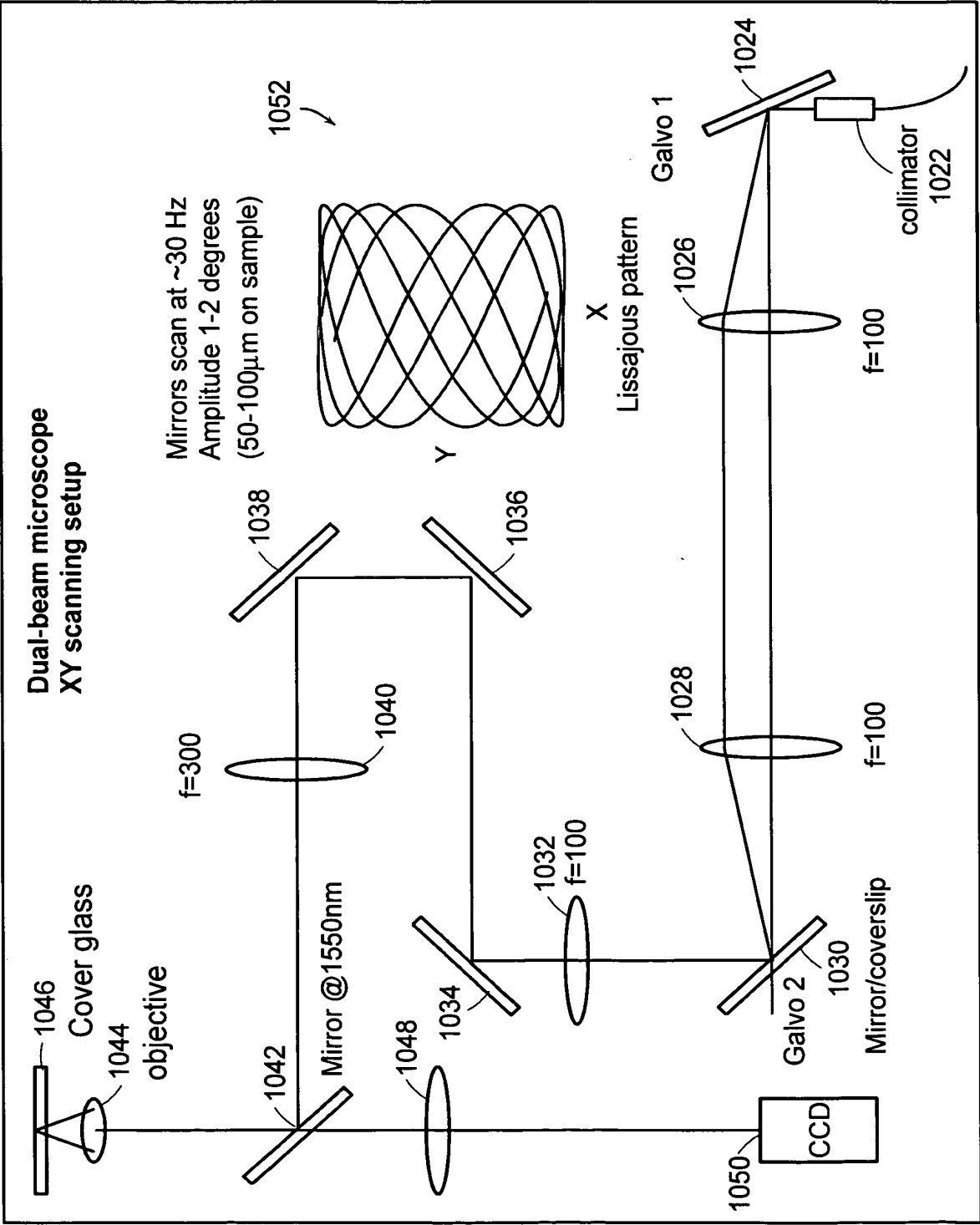


FIG. 30

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1070
)

Beam scanning data from a blank coverglass. Noise ~25 mrad over 1kHz

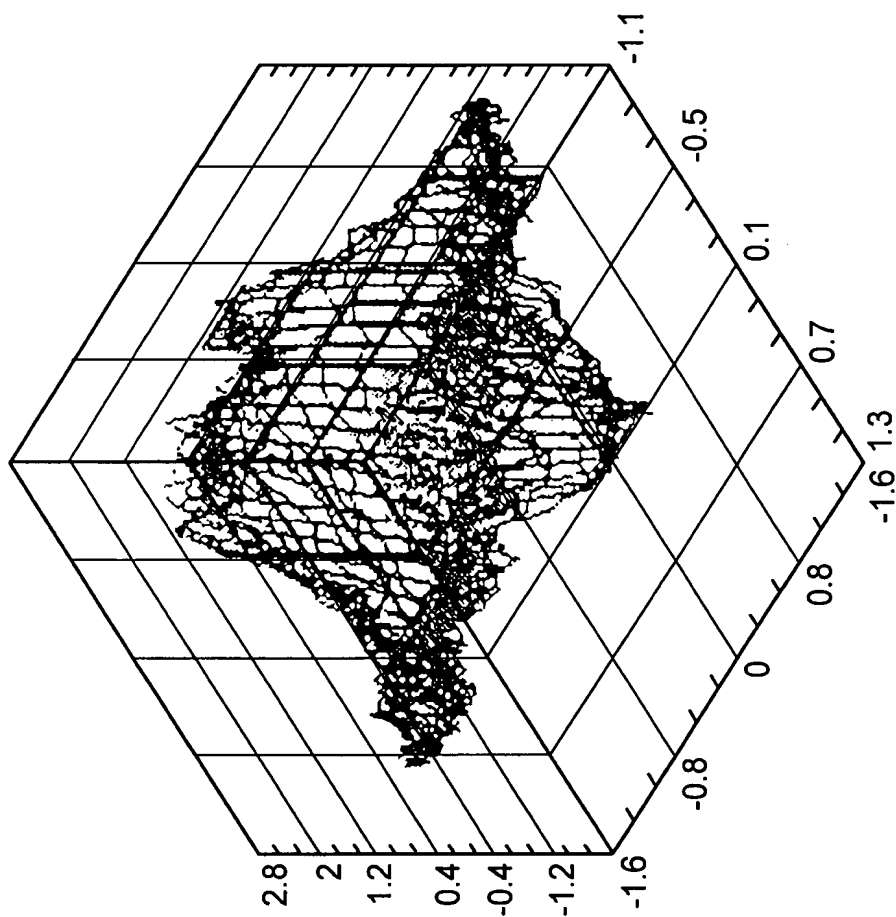


FIG. 31

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Beam scanning data from a blank coverglass. Noise ~25 mrad over 1kHz

1080

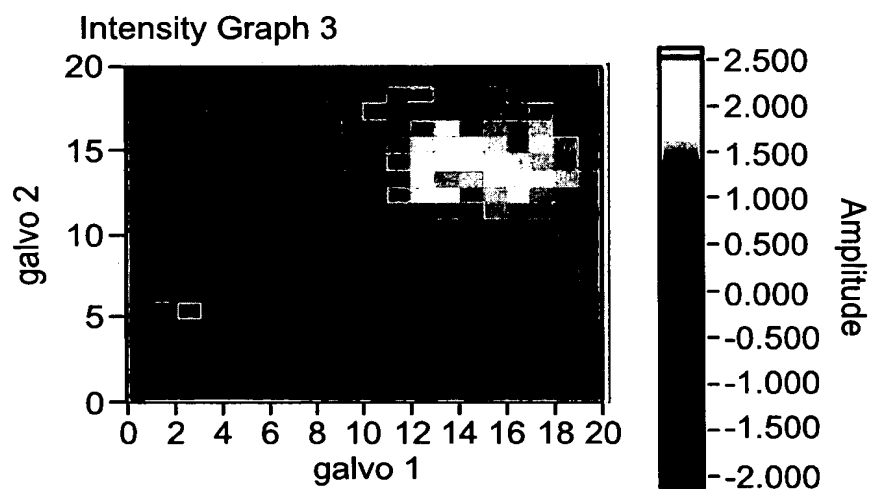


FIG. 32A

1090

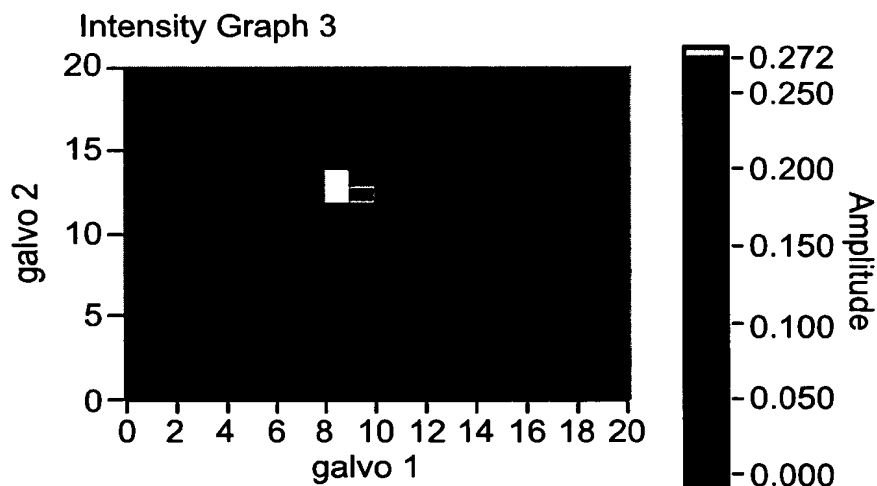


FIG. 32B

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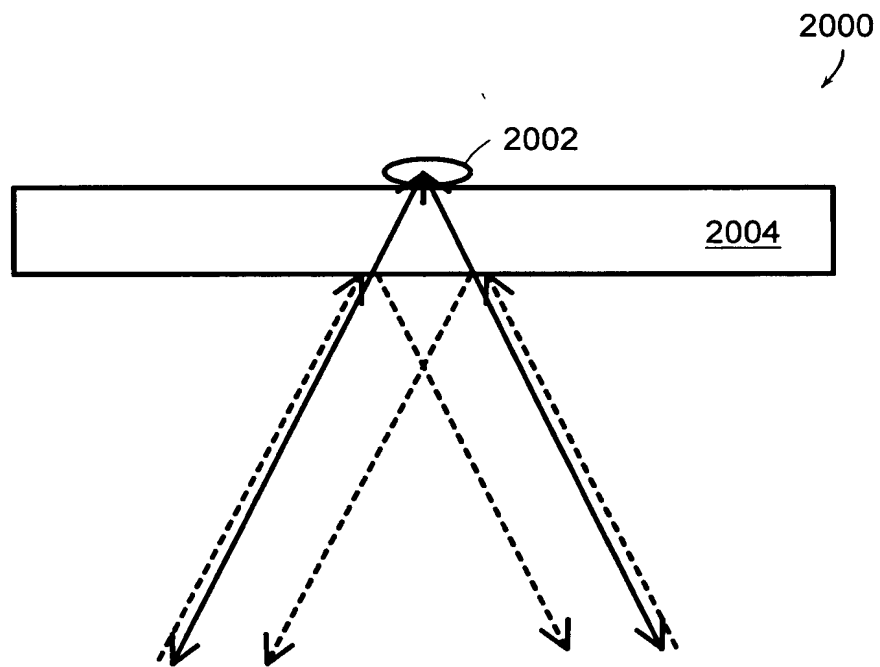


FIG. 33

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2020

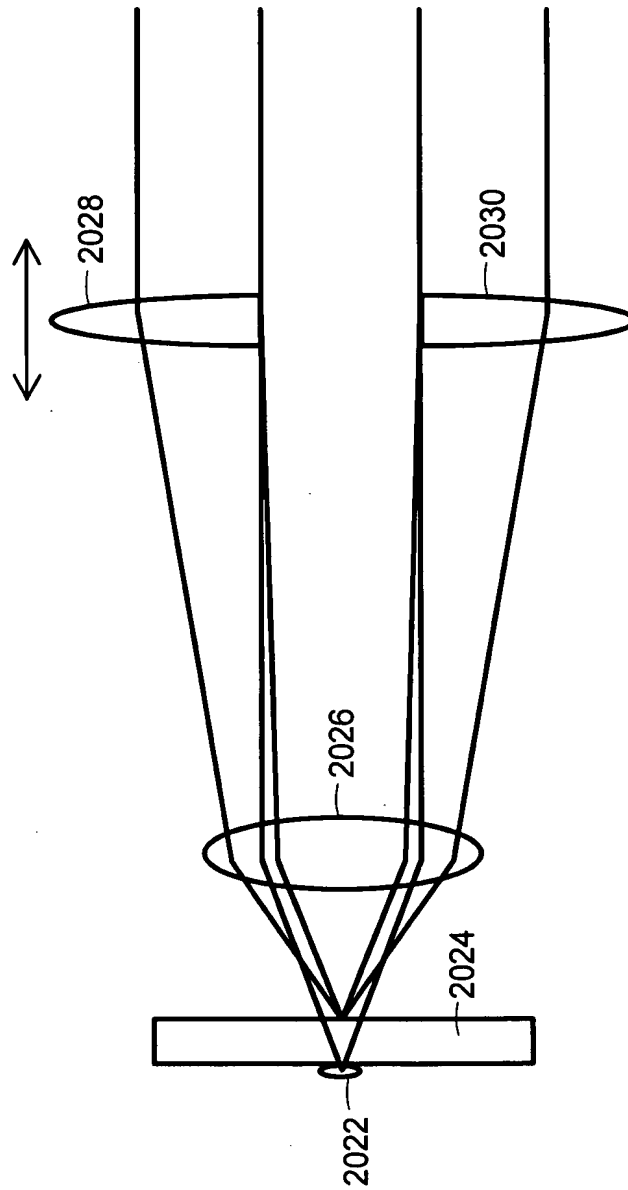


FIG. 34

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2050
/

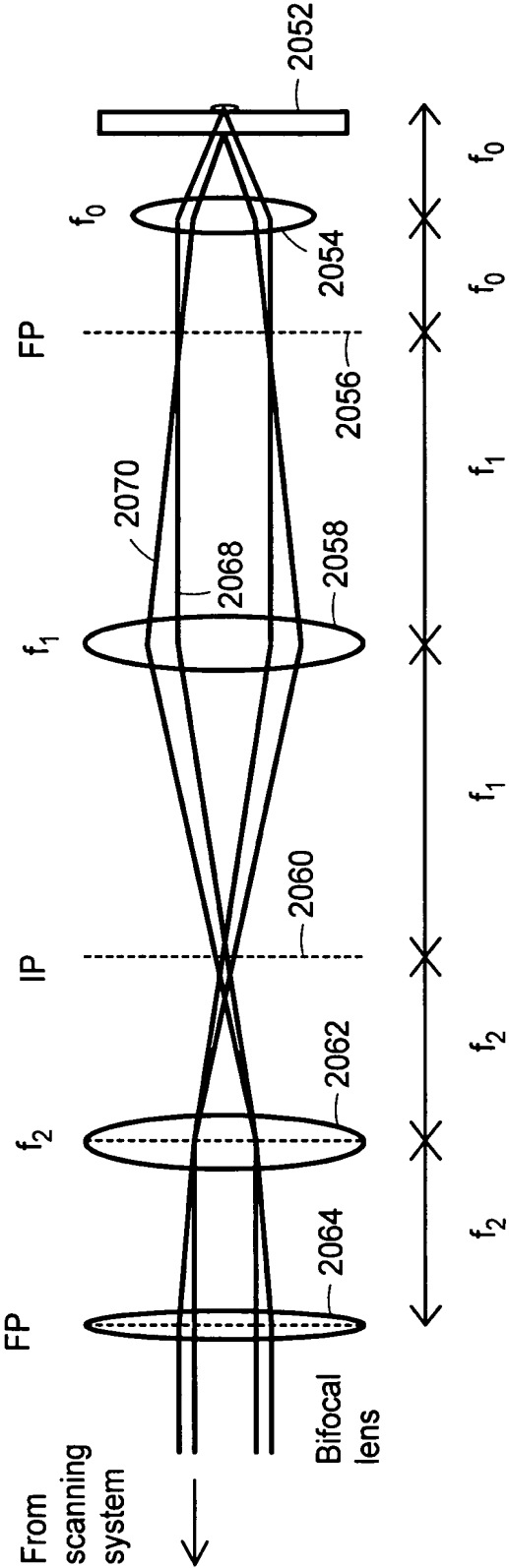


FIG. 35

Optical design by ray tracing

```

= f0 = 6.4;
f1 = 300;
f2 = 100;
f3 = 50;
delta = .1;

delta = .1;
soln =
  Solve[
    (t[z0 - delta] . lens[f0] . t[a1 - z0] .
     lens[f1] . t[z2 - z1] . lens[f2] .
     t[d3var] . lens [f3] .
     {.6 wmax, 0}) [[1]] - 0, f3var]

```

```

Out[246]= {{d3var -> 104.489}}

```

```

x0 = f0;
x1 = 2 f0 + f1;
x2 = 2 f0 + 2 f1 + f2;
x3 = 2 f0 + 2 f1 + f2;

```

```
na = 0.4;
```

```
(* TRANSFER AND LENS MATRICES *)
```

```

t[z_] := {{1, z}, {0, 1}};
lens[f_] := {{1, 0}, {-1/f, 1}};

```

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Distance between f3 and f2 in order
to shift focus by 100 microns

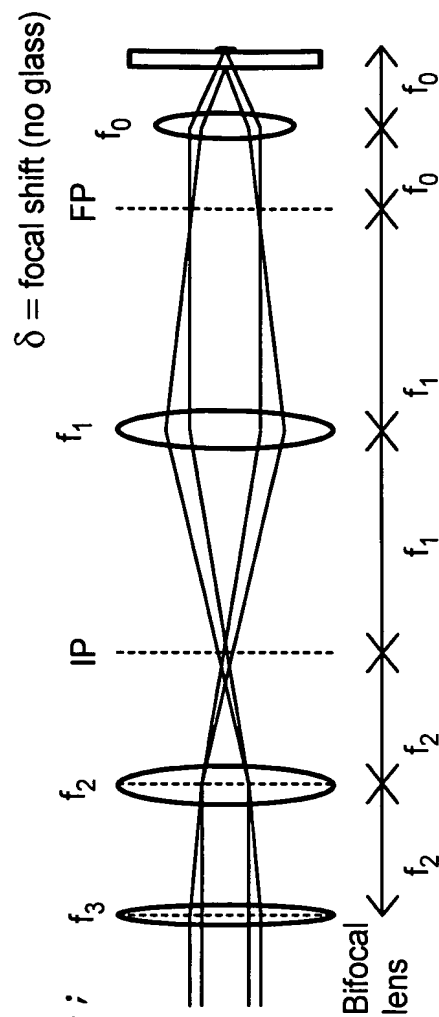


FIG. 36

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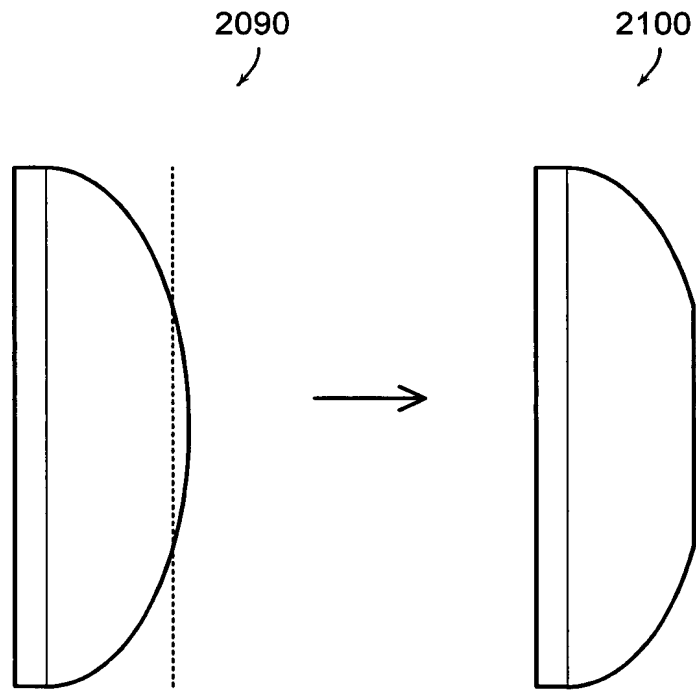


FIG. 37

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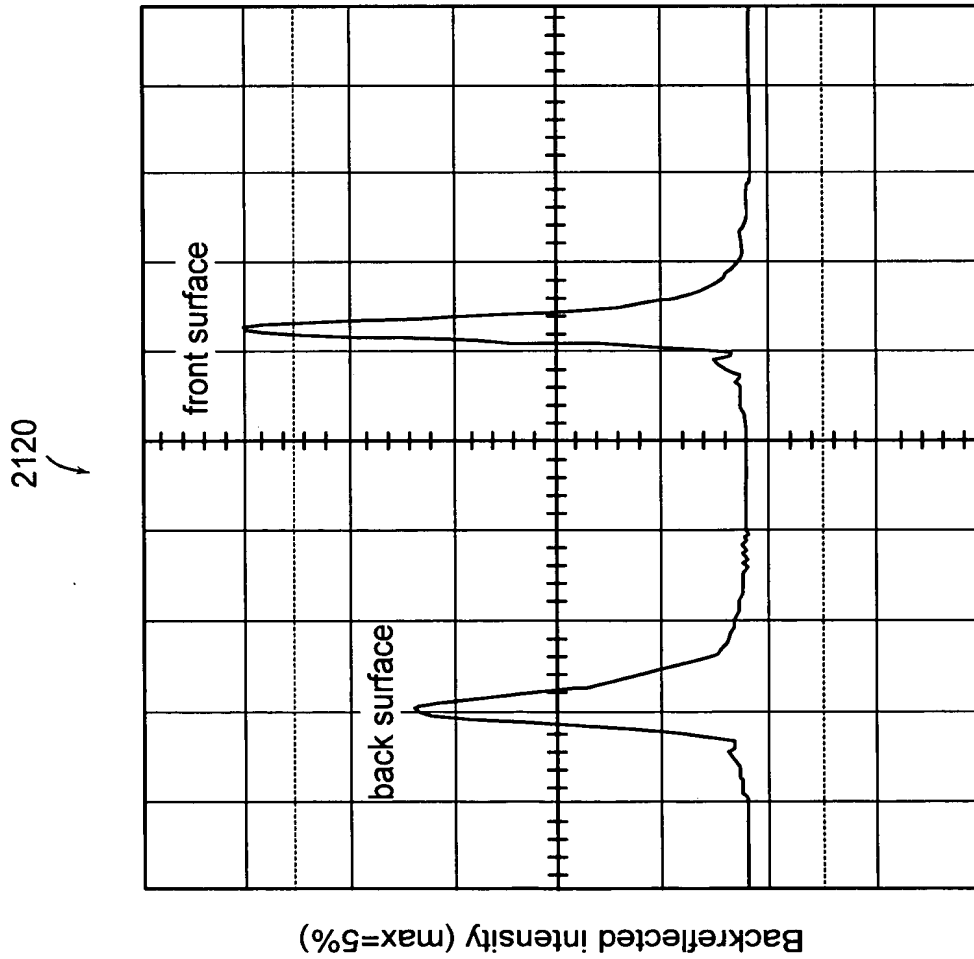
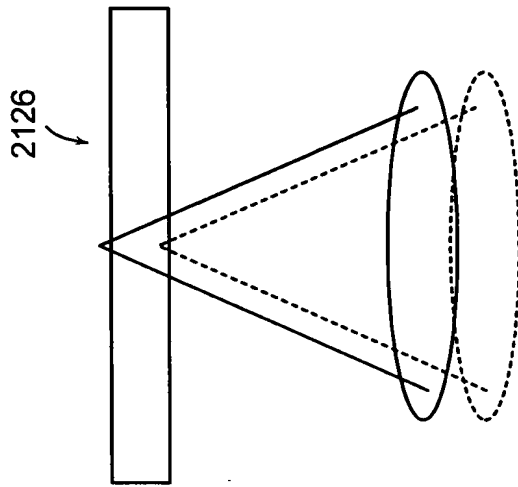
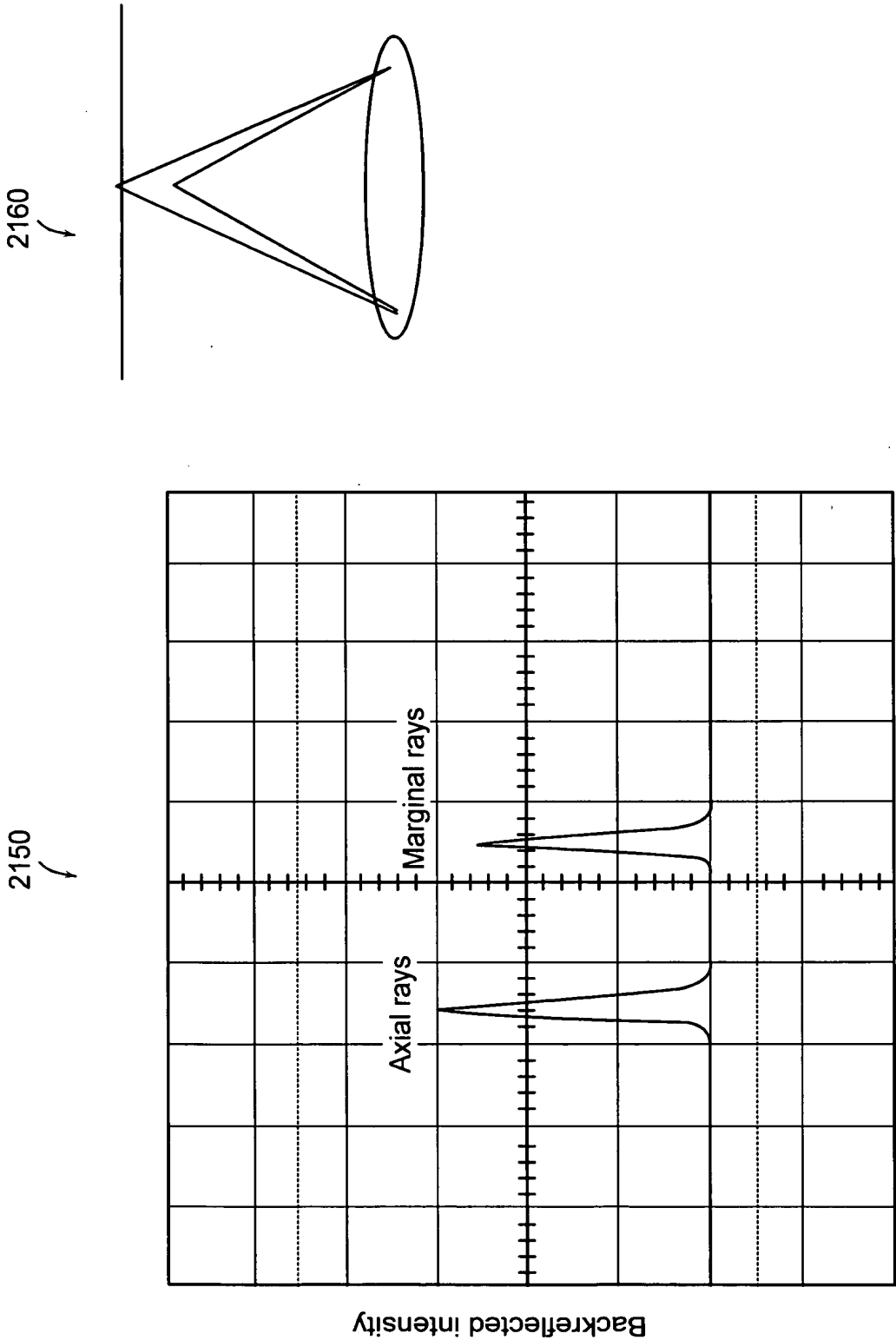


FIG. 38



Objective focus position

FIG. 39

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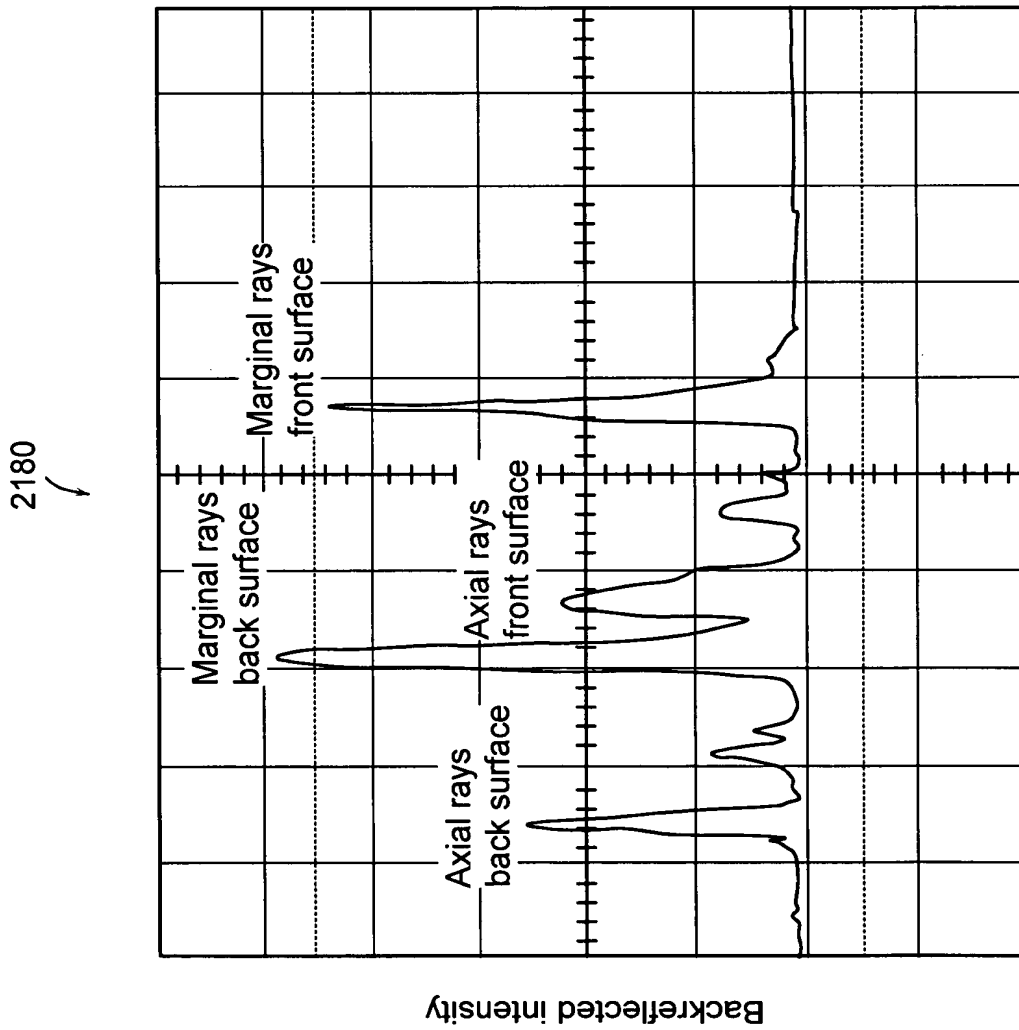
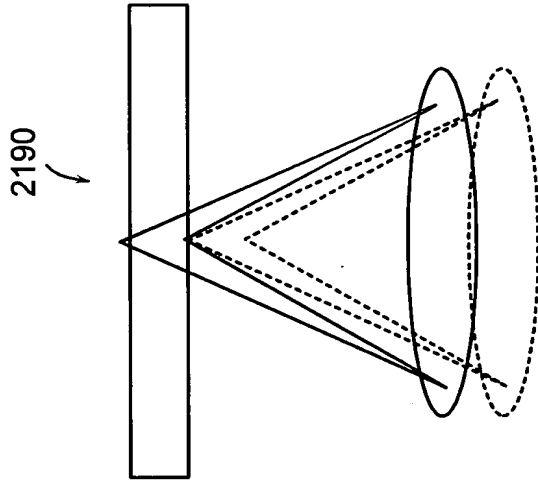


FIG. 40

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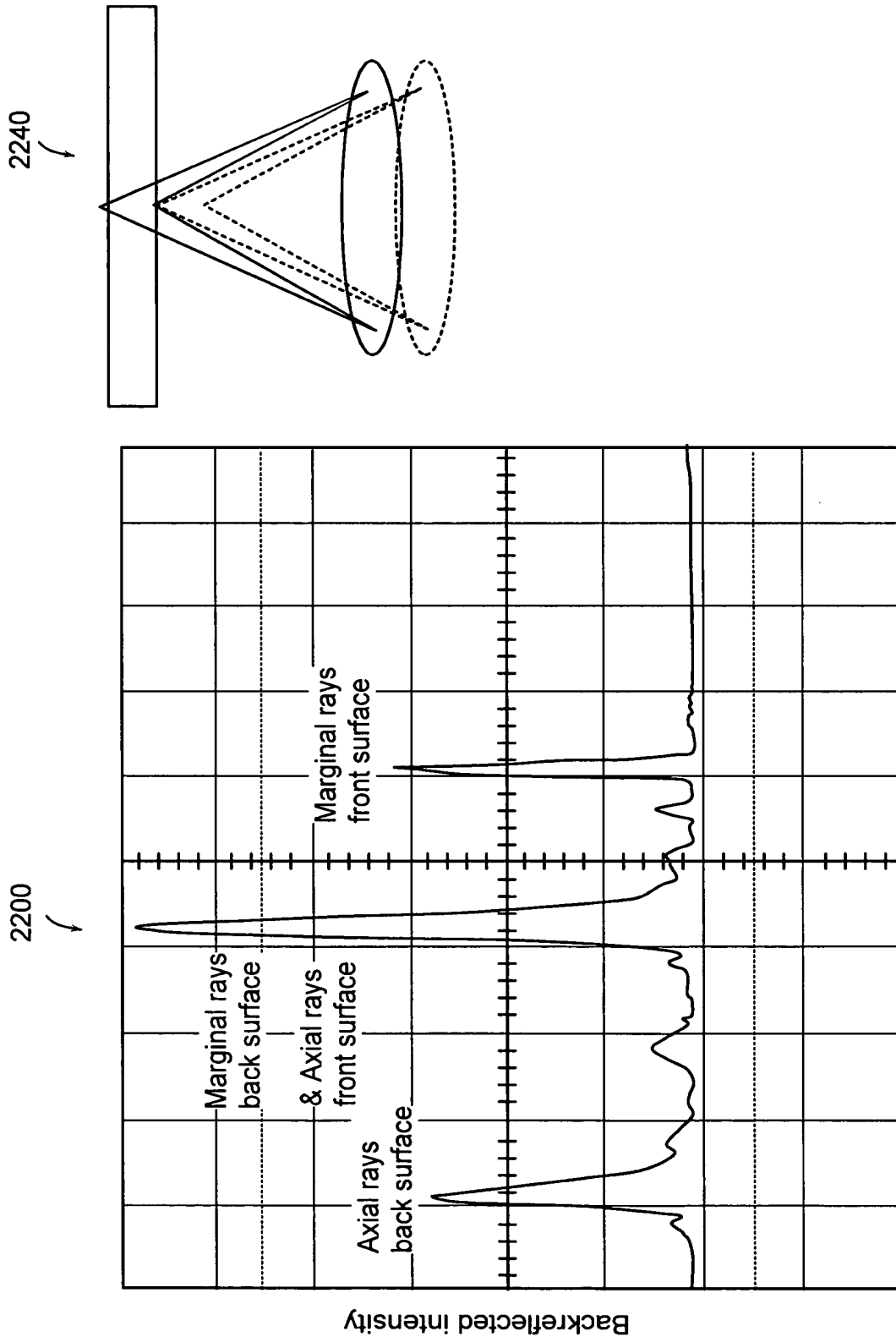


FIG. 41

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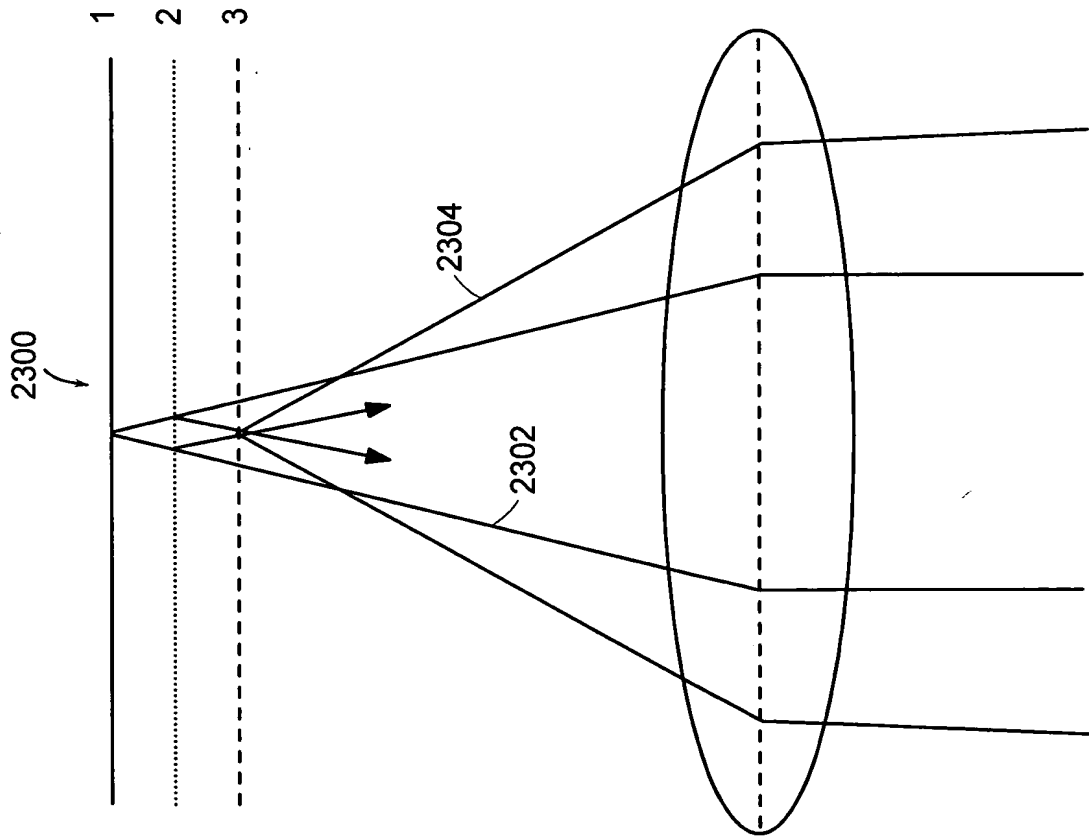


FIG. 42A

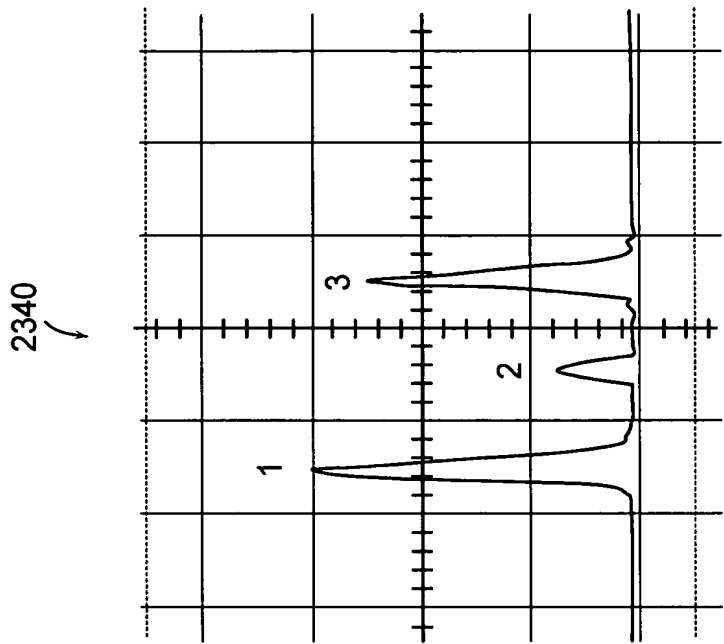


FIG. 42B

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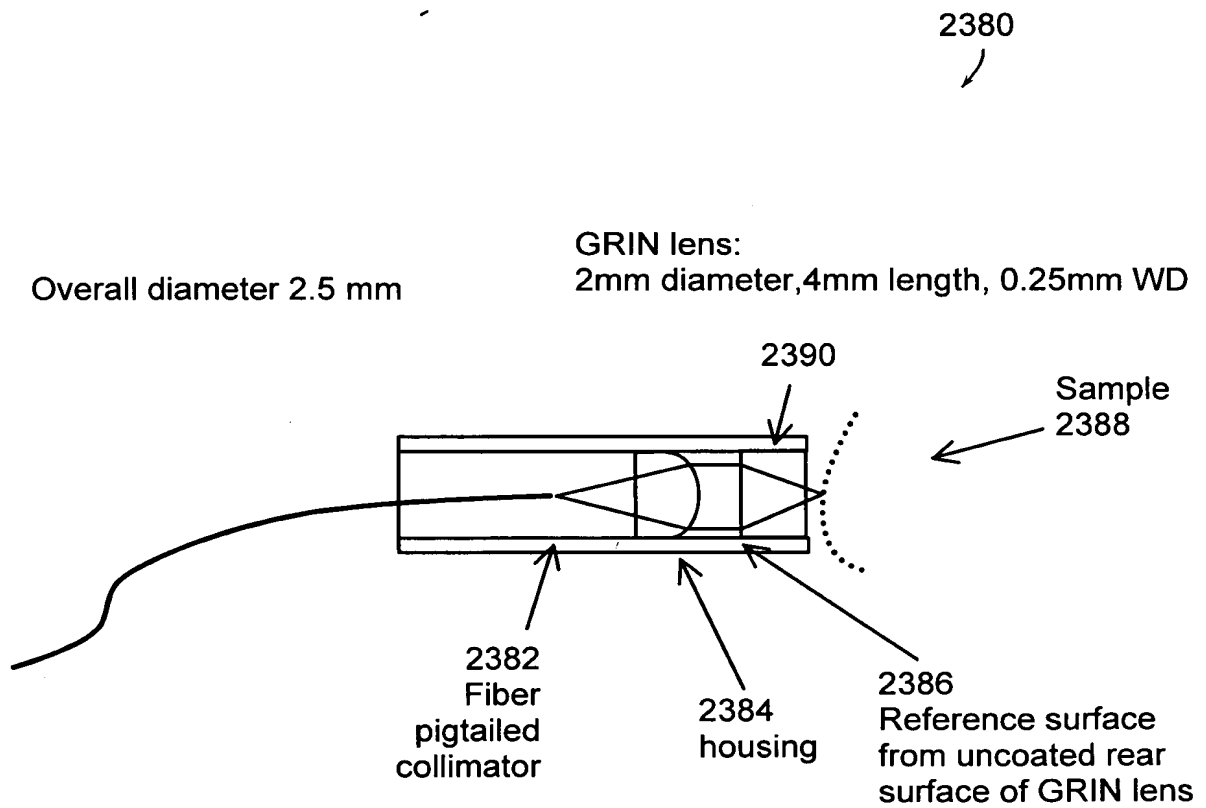


FIG. 43

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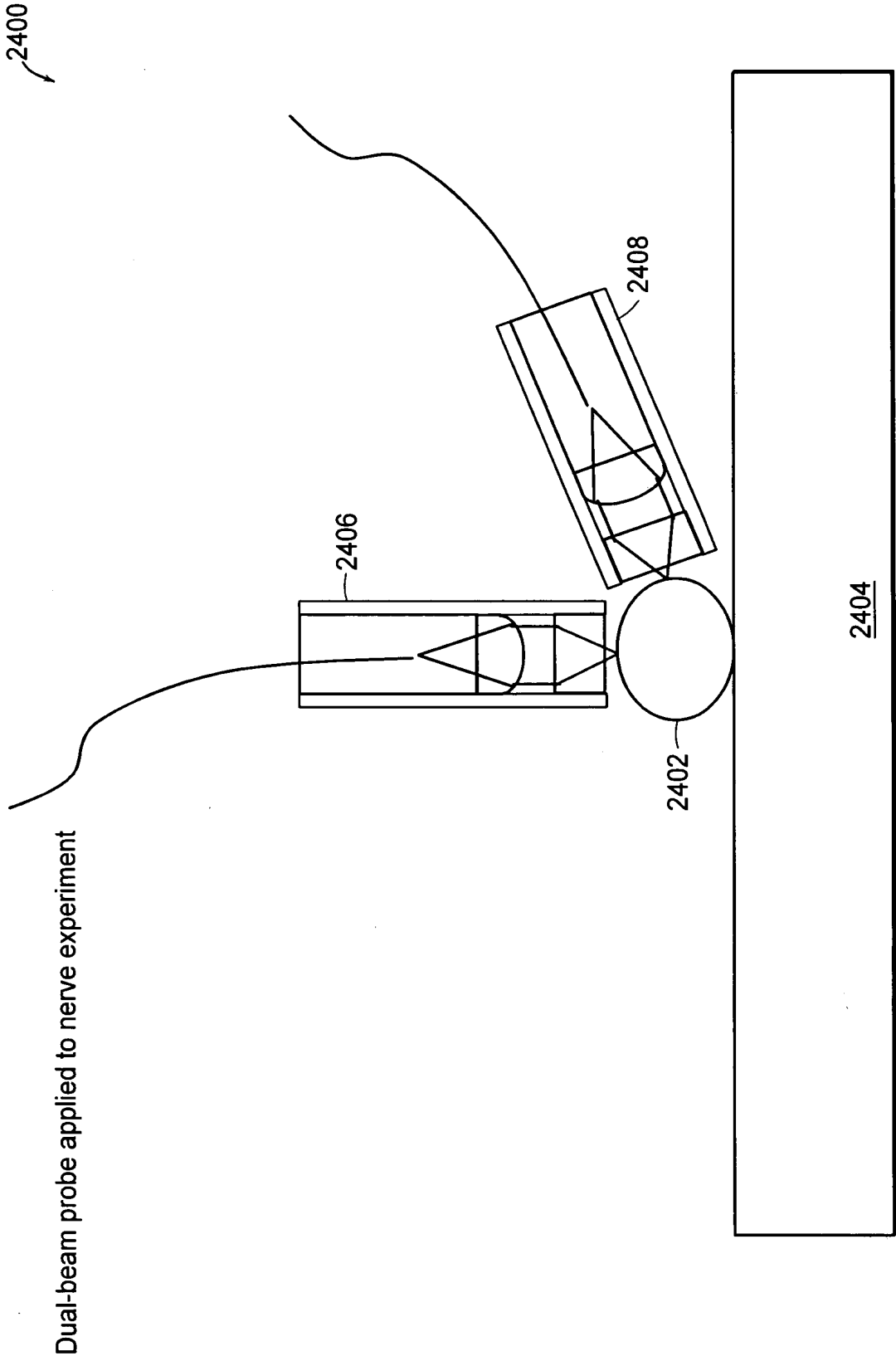


FIG. 44

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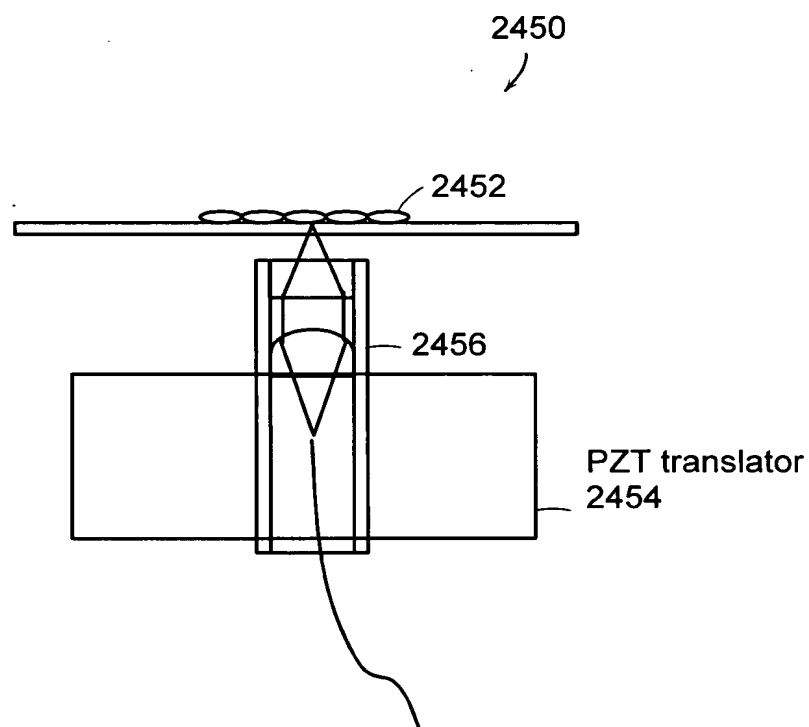


FIG. 45

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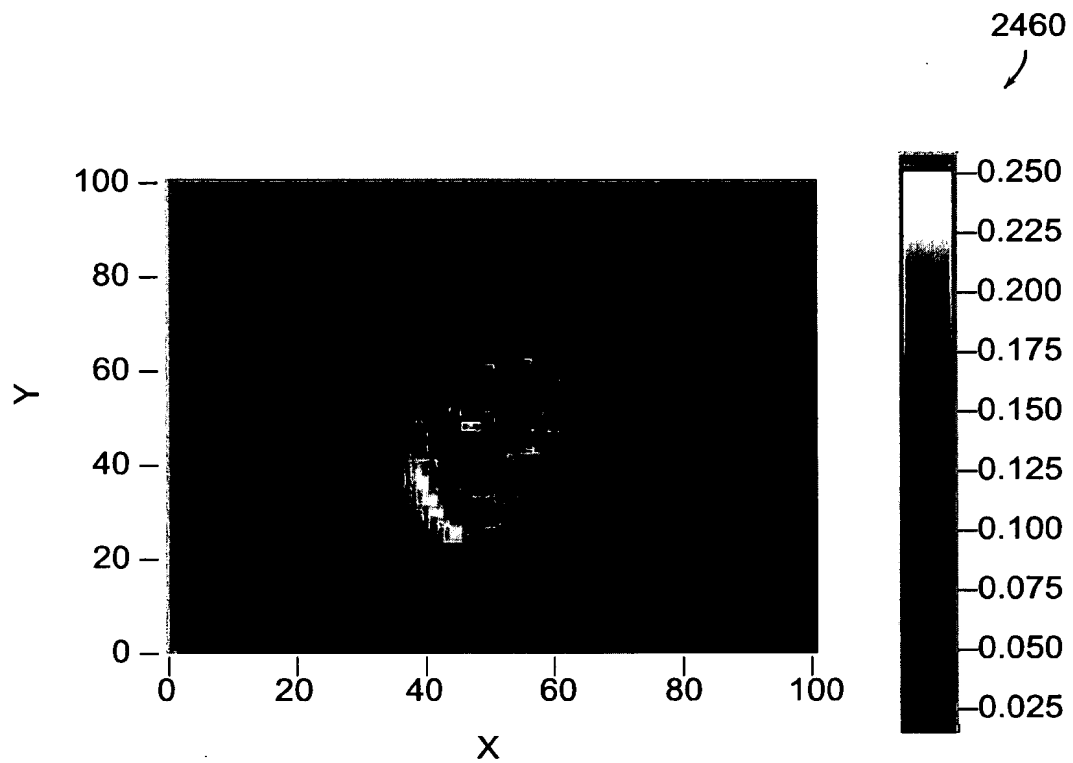


FIG. 46A

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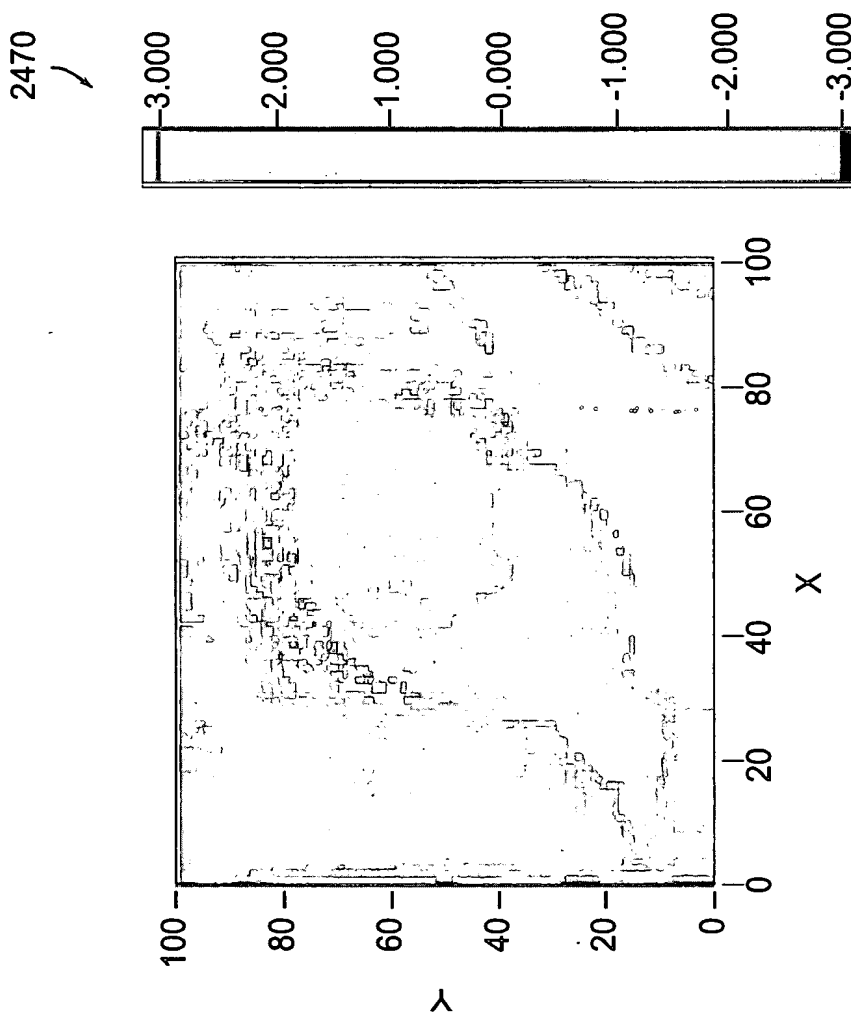


FIG. 46B

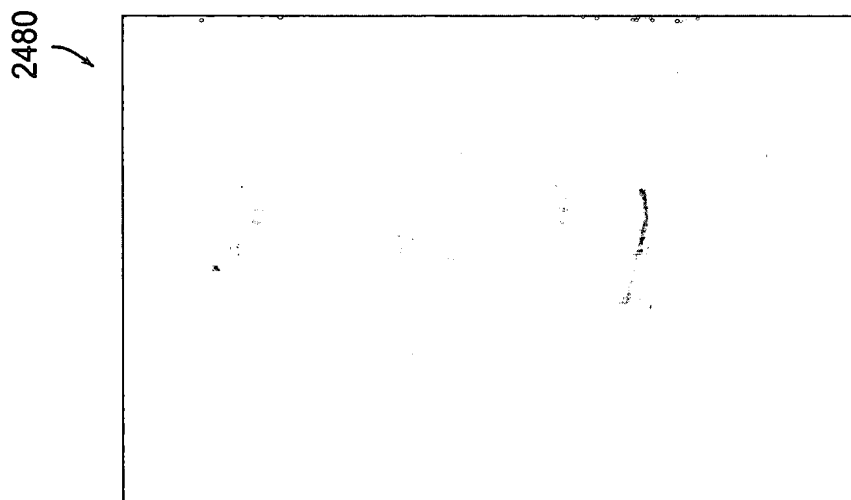


FIG. 46C

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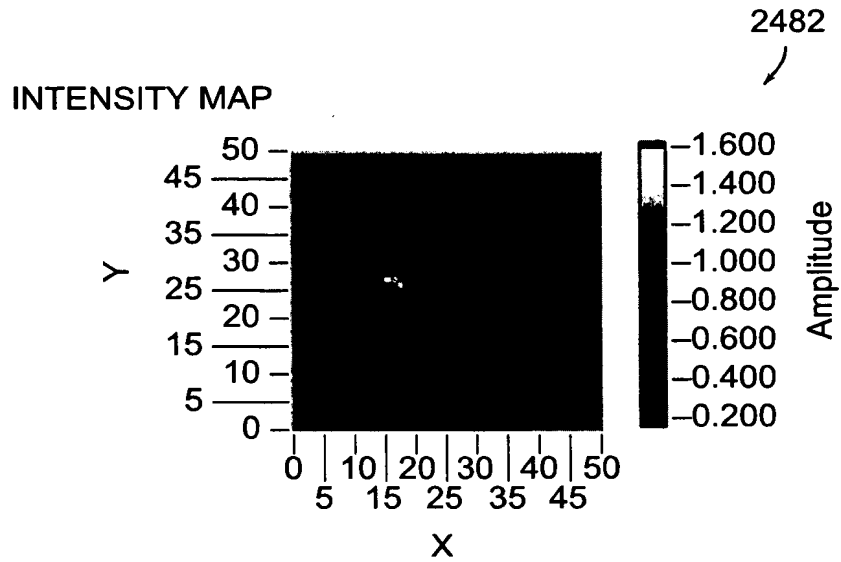


FIG. 46D

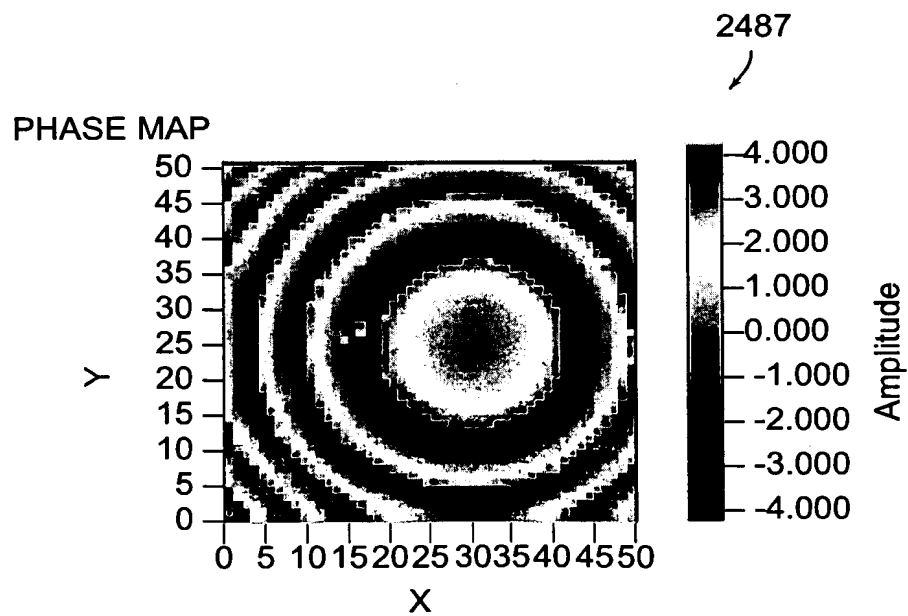


FIG. 46F

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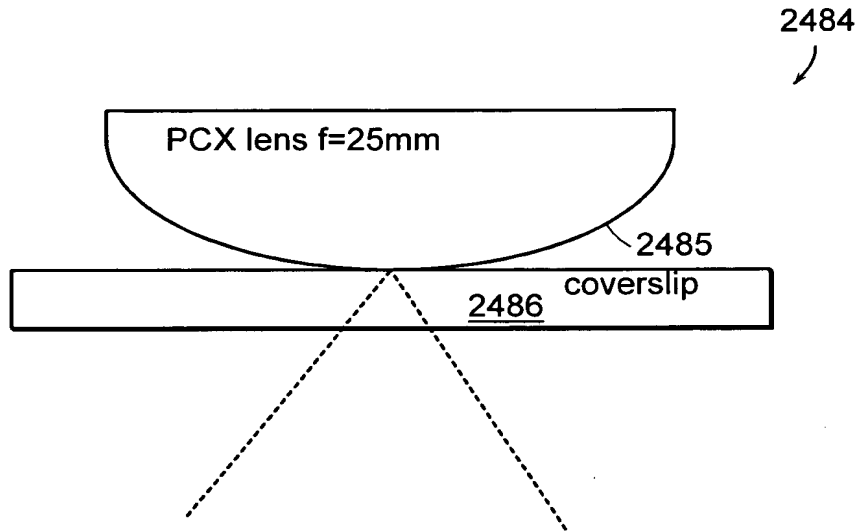


FIG. 46E

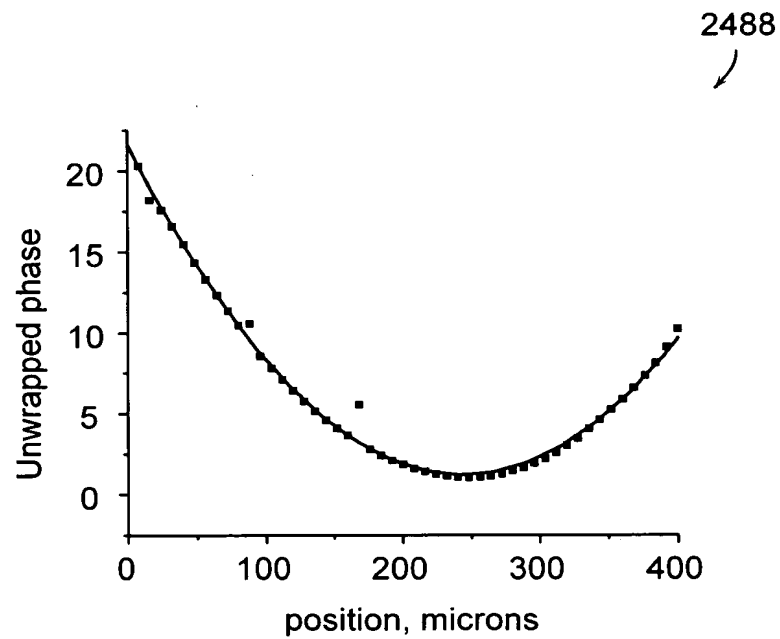


FIG. 46G

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2490 ↗

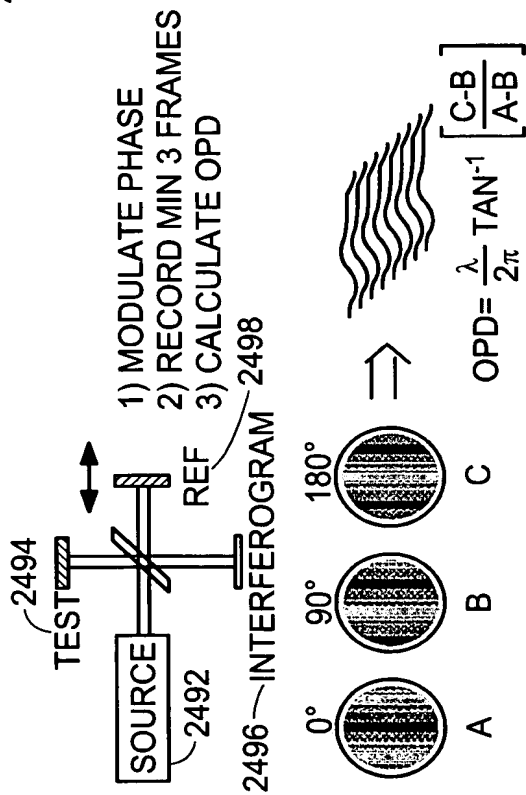


FIG. 47A

Phase stepping 2500 ↗

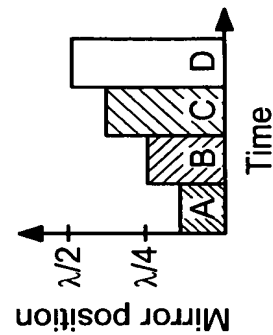


FIG. 47B

2510 ↗

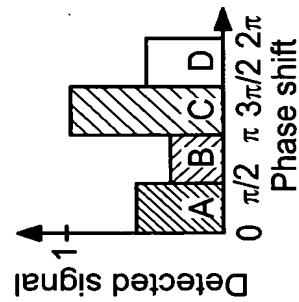


FIG. 47C

Bucket integration 2520 ↗

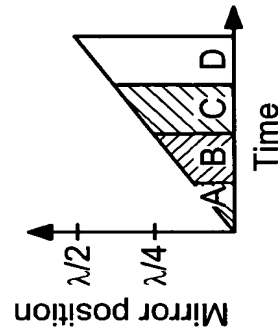


FIG. 47D

2530 ↗

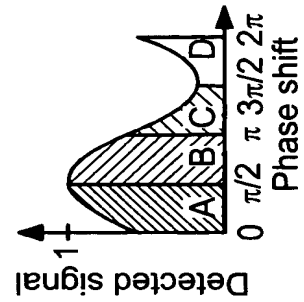


FIG. 47E

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Bucket integration

2540 ↗

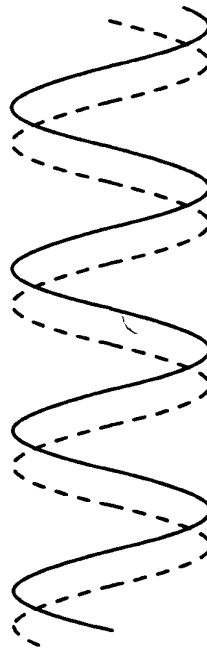


FIG. 48A

2550 ↗

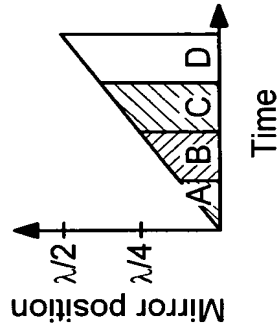


FIG. 48B

2560 ↗

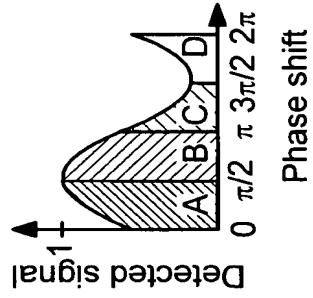


FIG. 48C

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2570

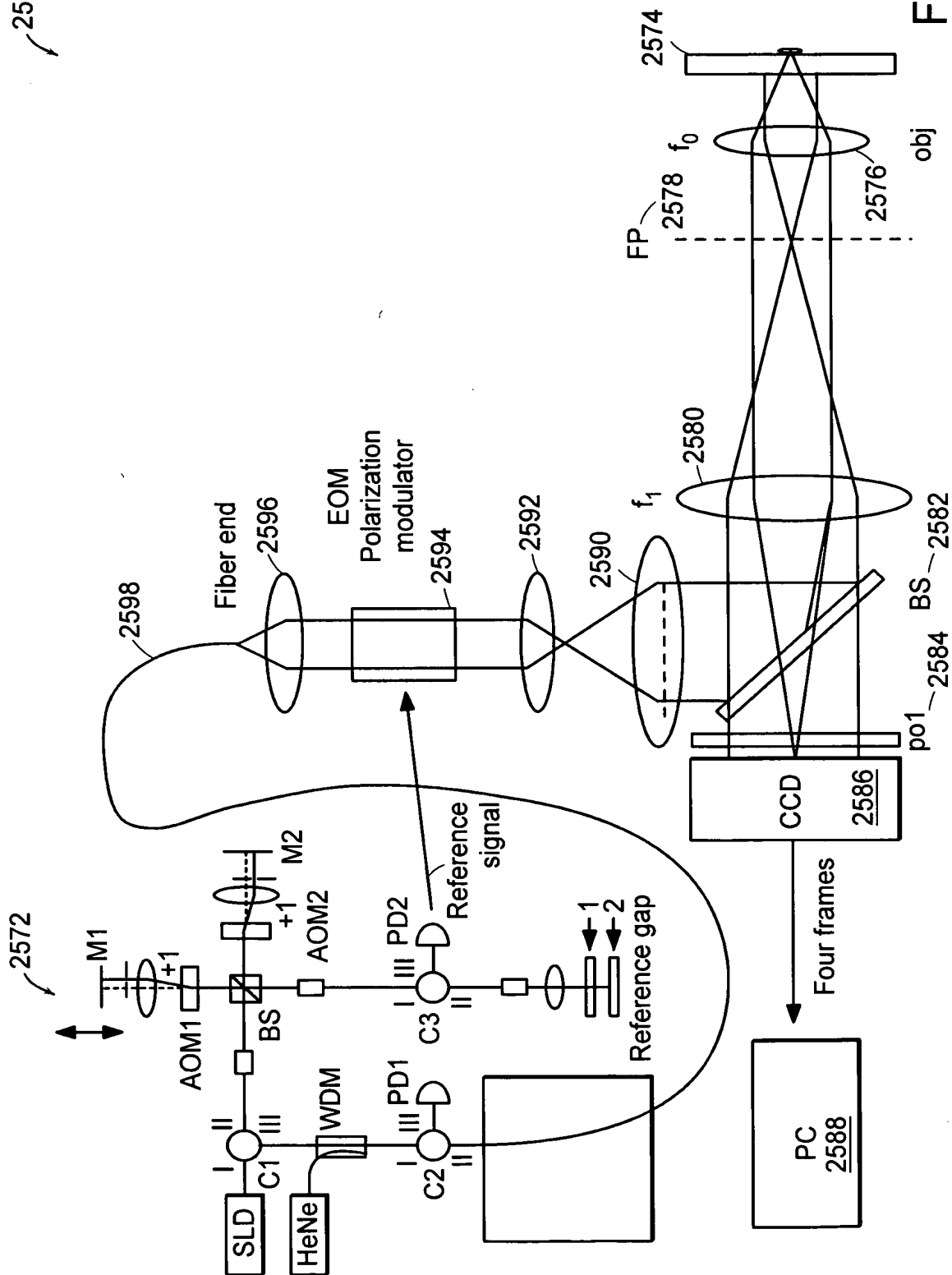
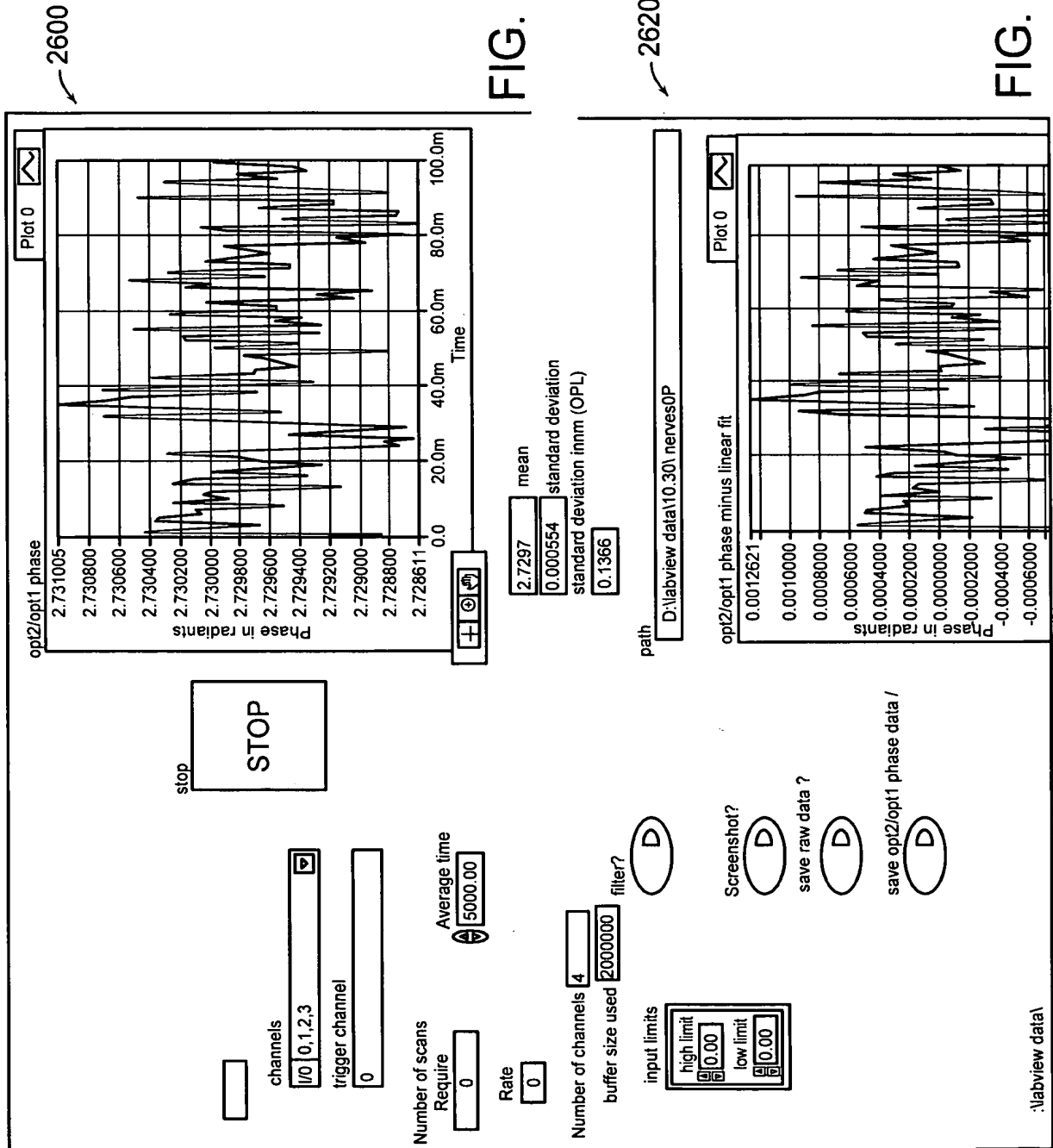


FIG. 49

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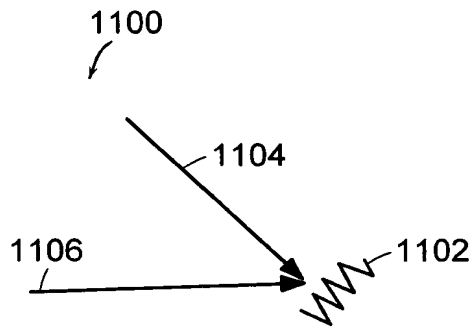


FIG. 51A

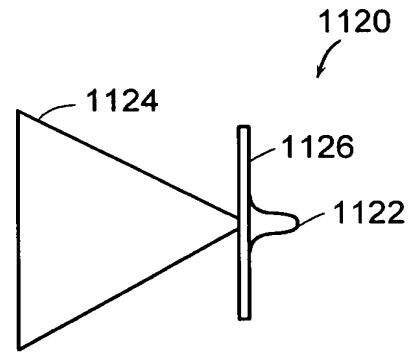


FIG. 51C

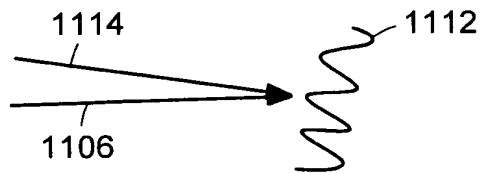


FIG. 51B

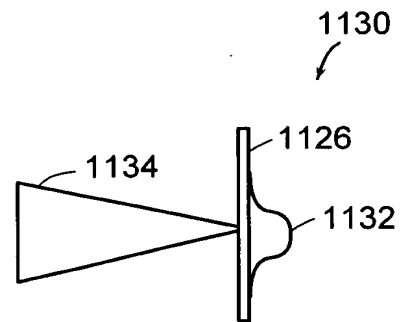


FIG. 51D

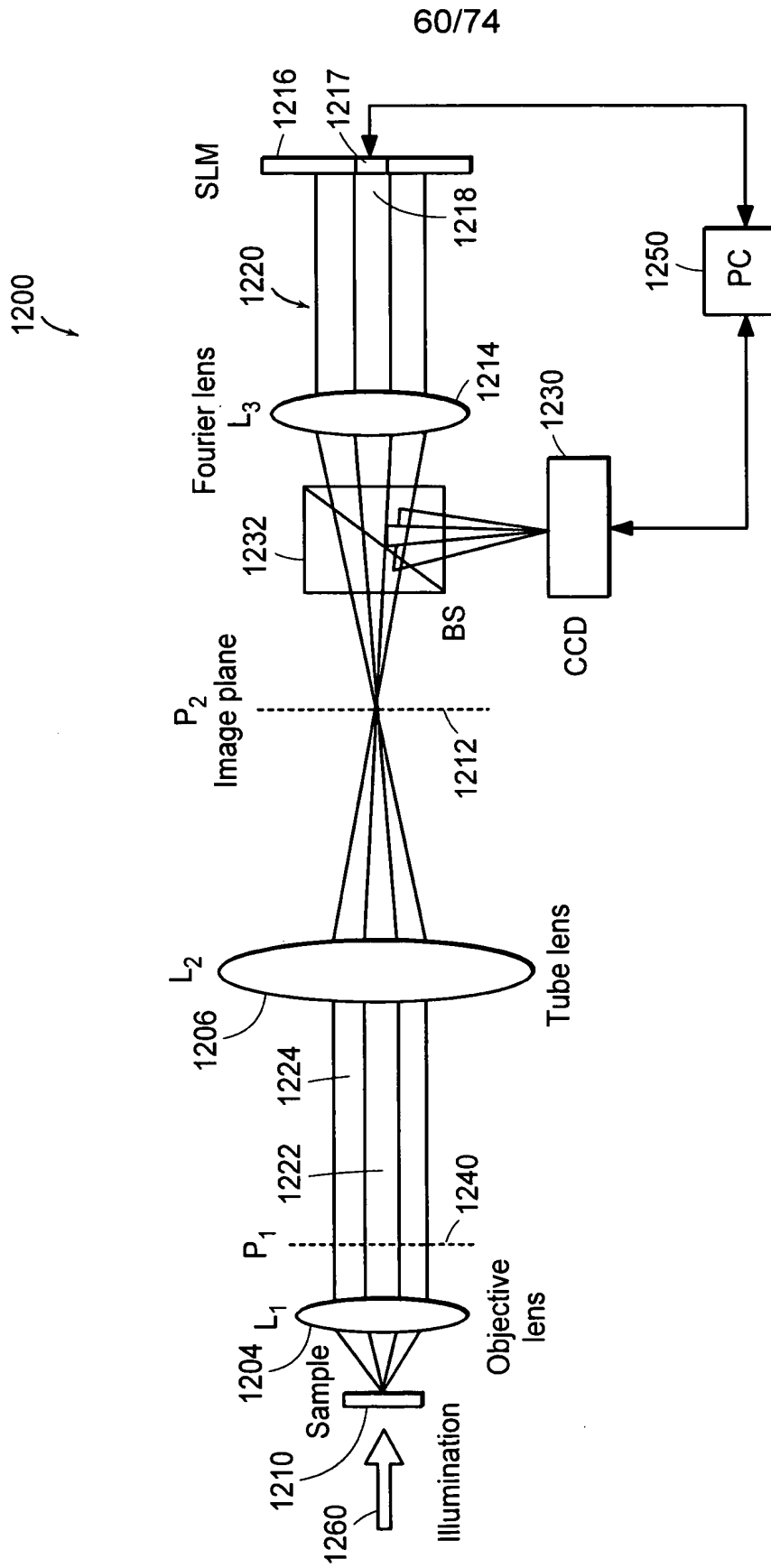


FIG. 52

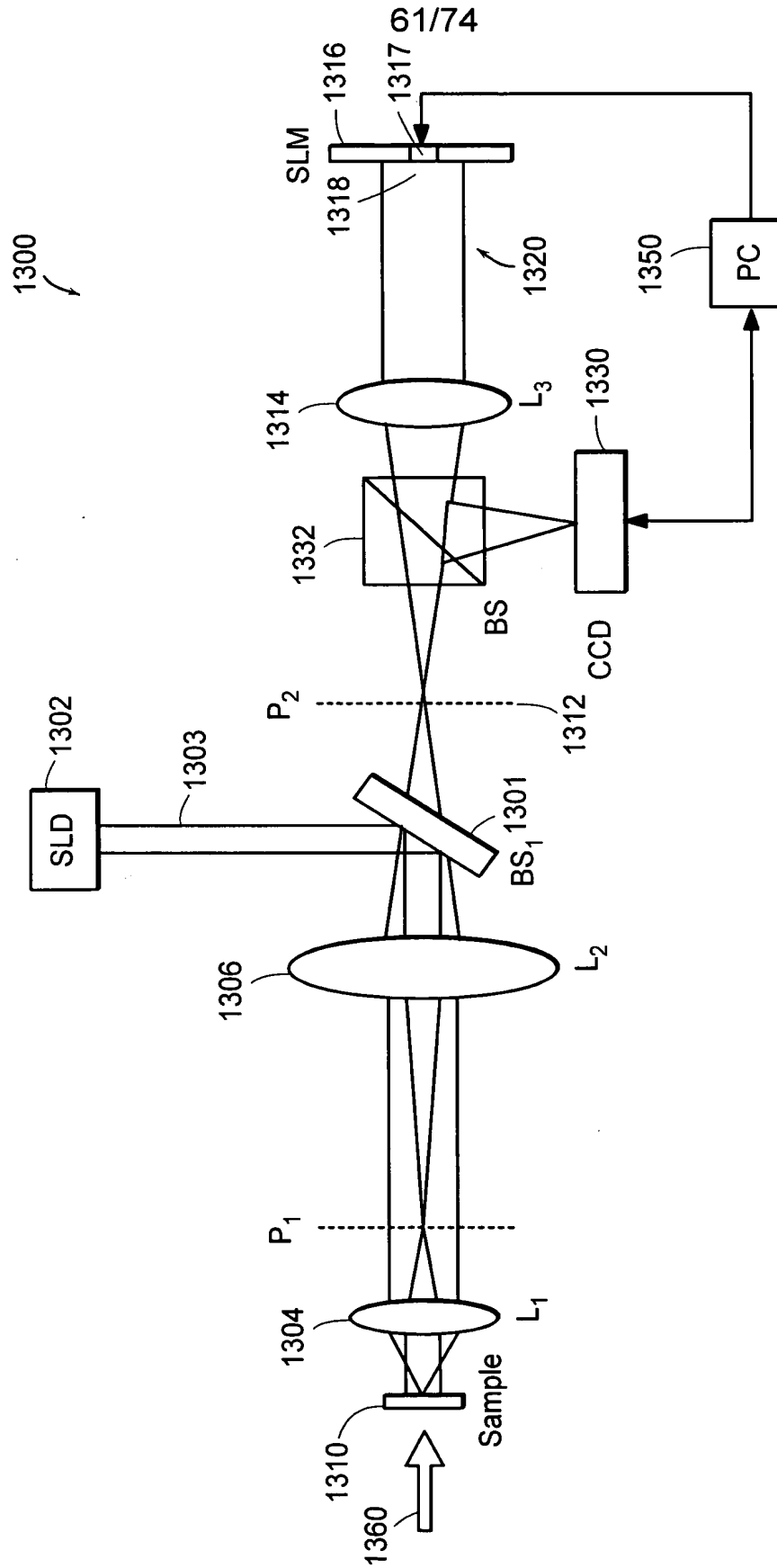


FIG. 53

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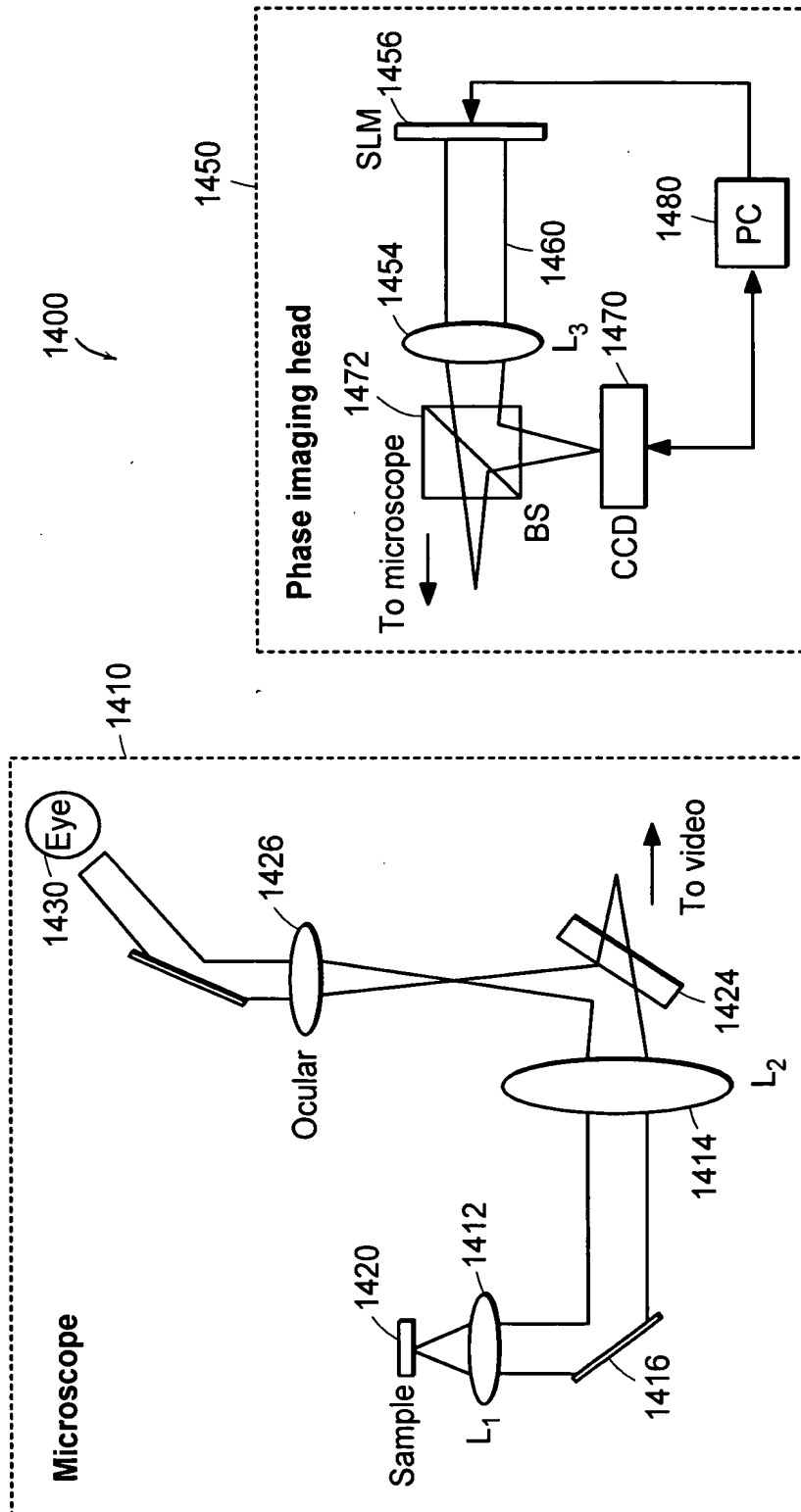


FIG. 54A

FIG. 54B

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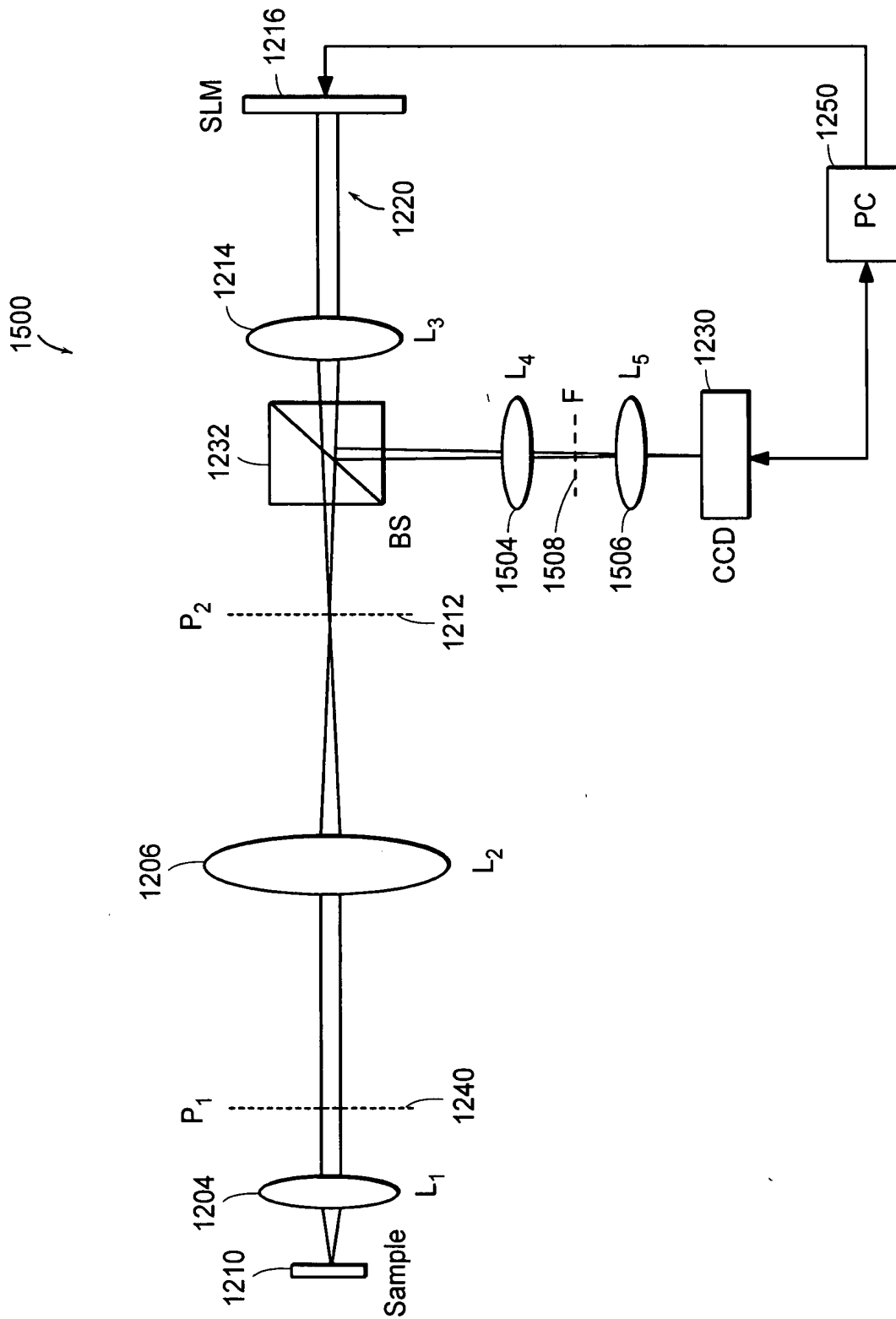


FIG. 55

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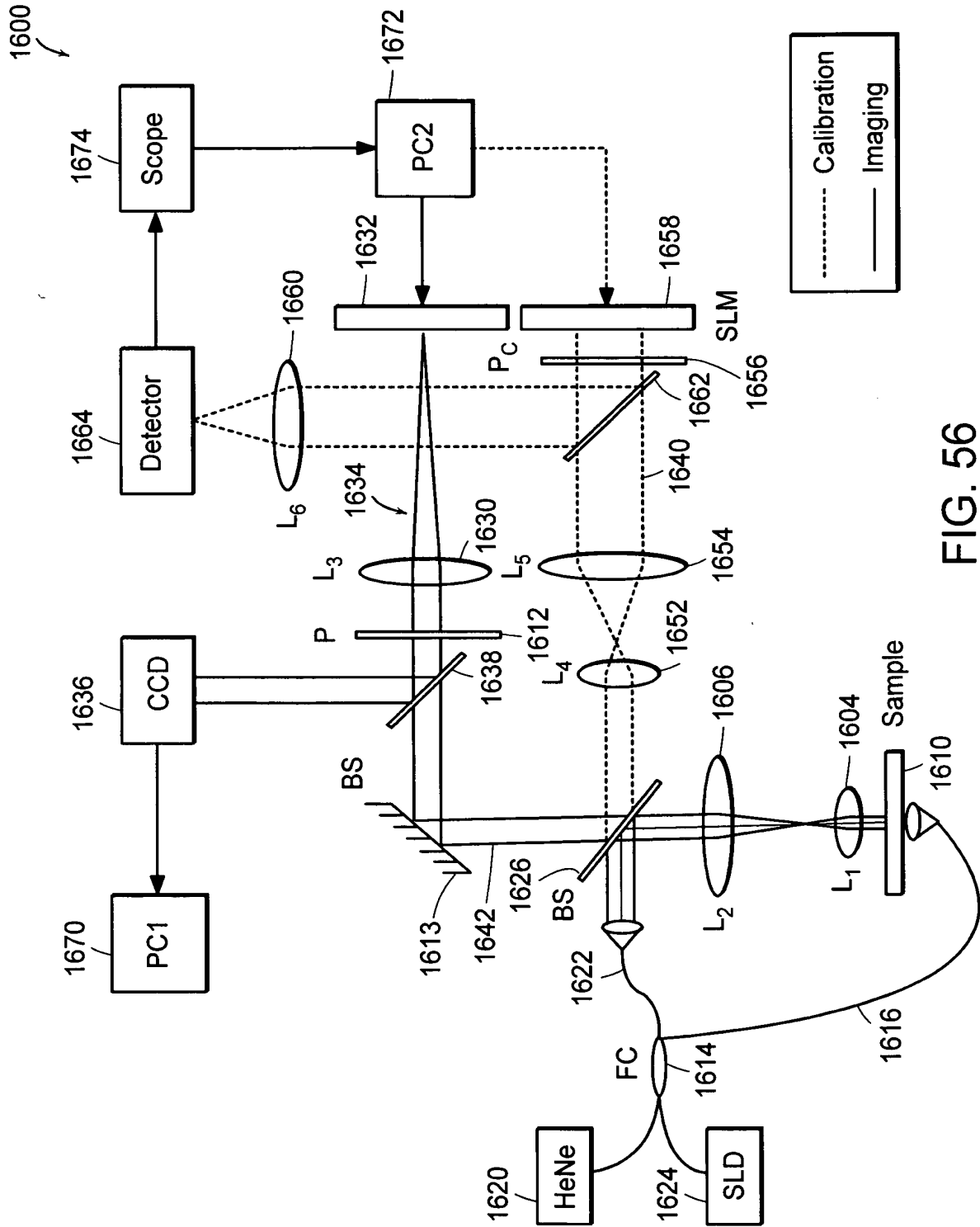


FIG. 56

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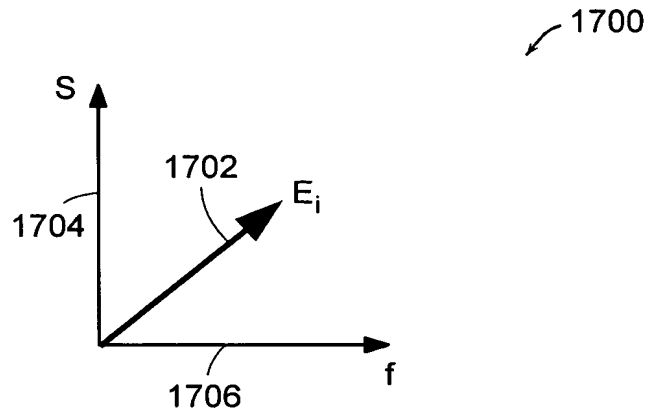


FIG. 57A

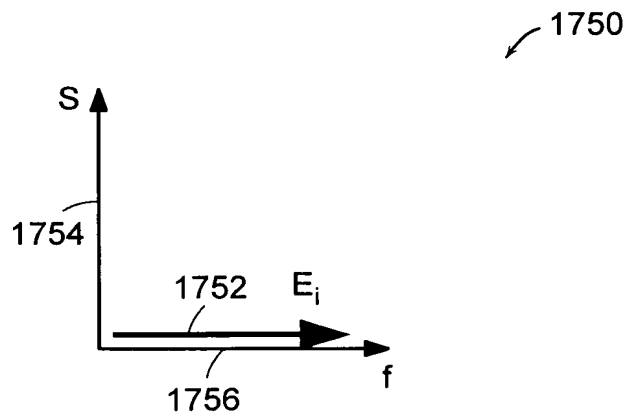
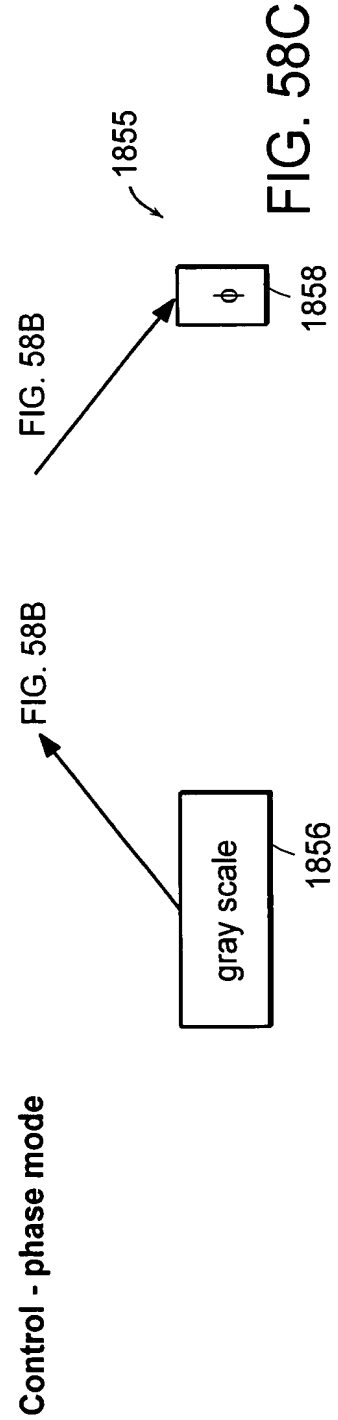
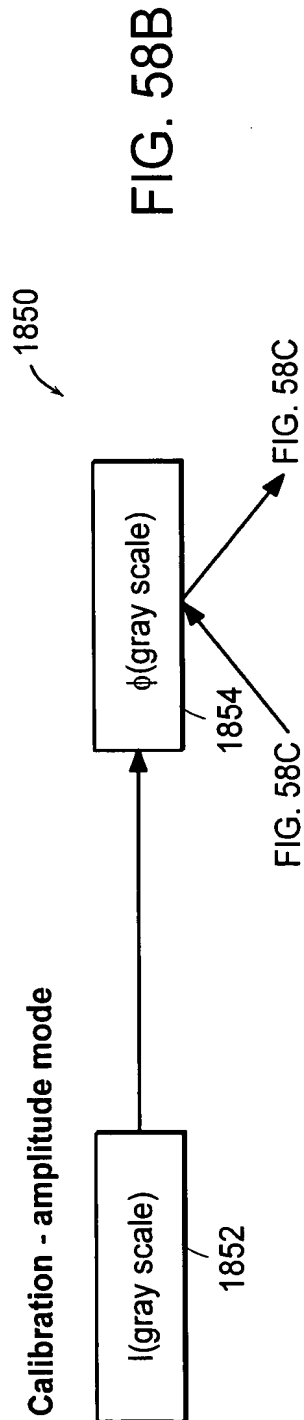
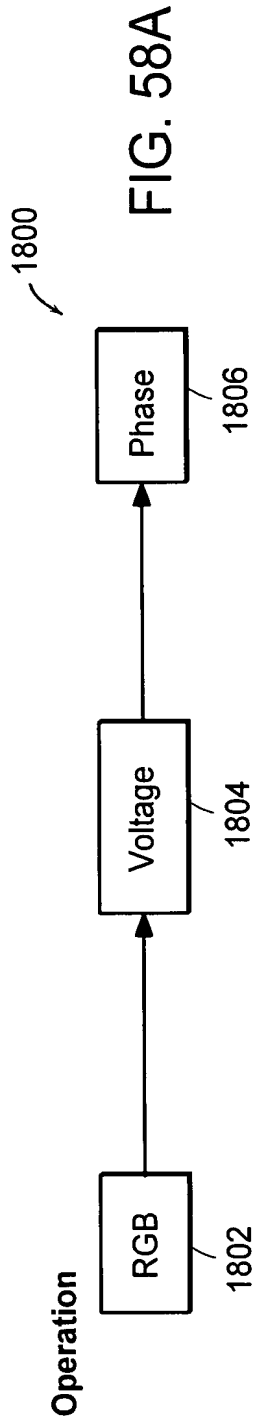


FIG. 57B

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Calibration Lookup Table

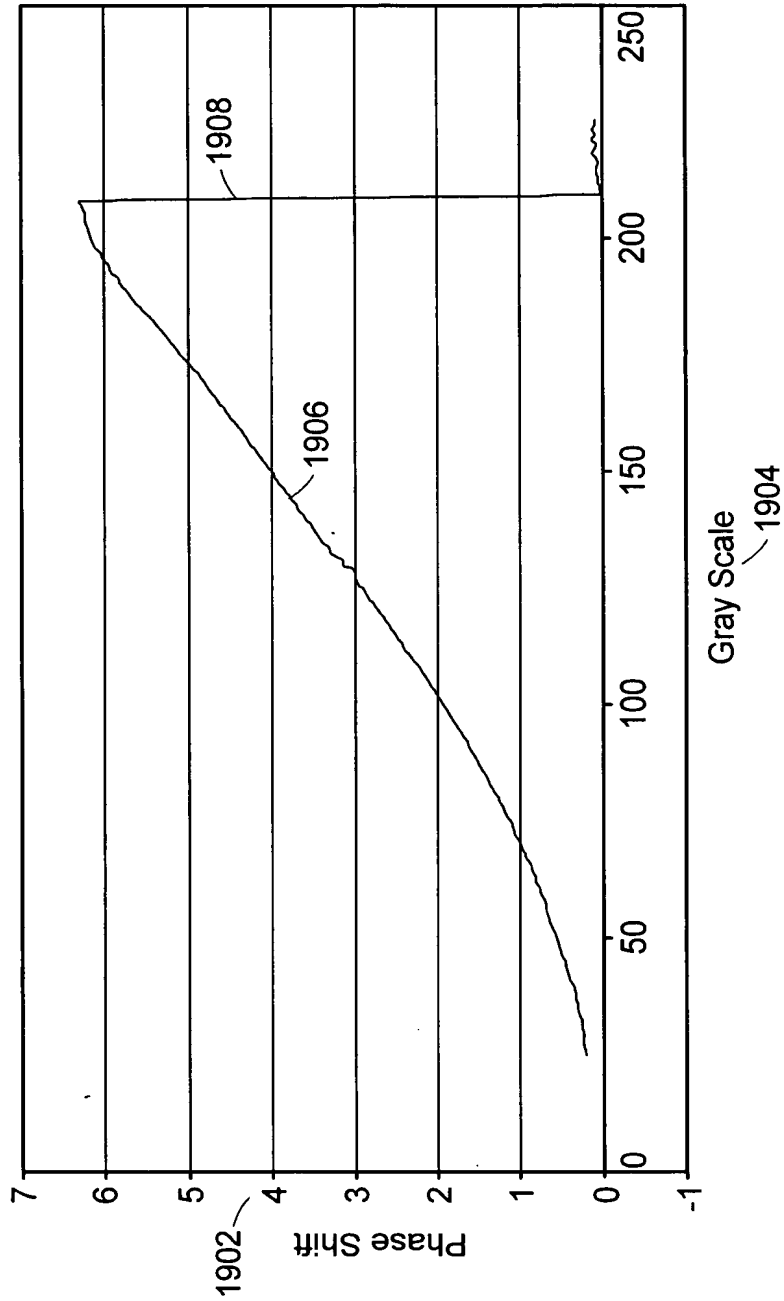
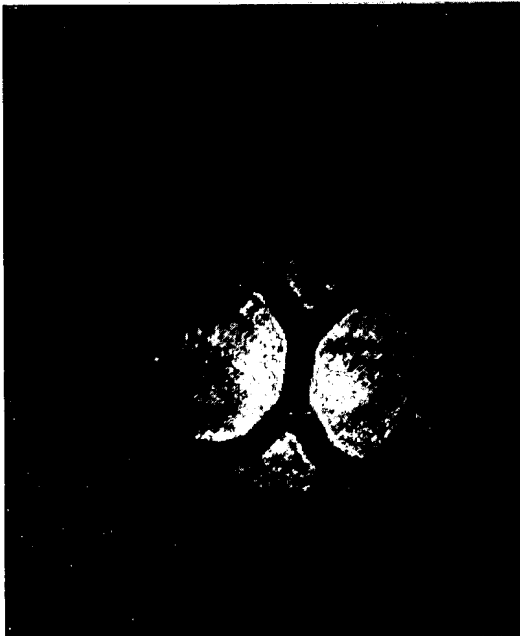


FIG. 59

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4-frame sequence
Magnification 13X

FIG. 60A



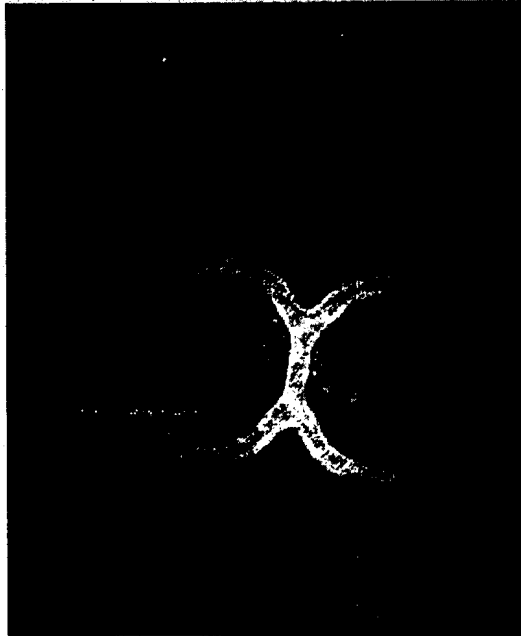
2000 ↘

FIG. 60C



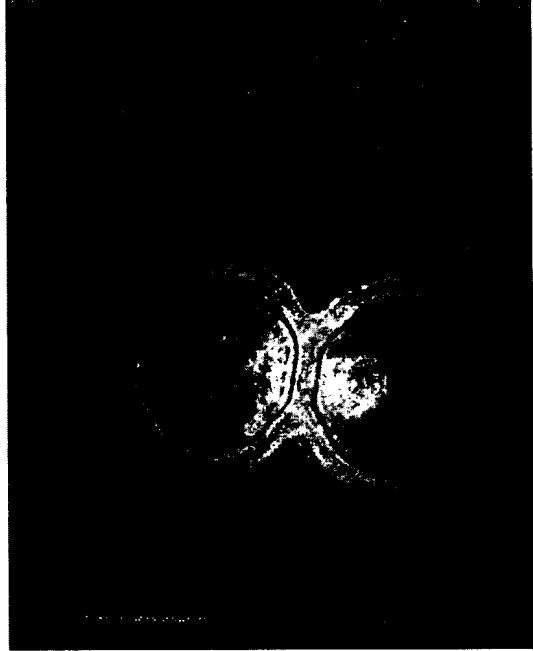
2400 ↘

FIG. 60B



2200 ↘

FIG. 60D



2600 ↘

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Phase between E_H and E_L

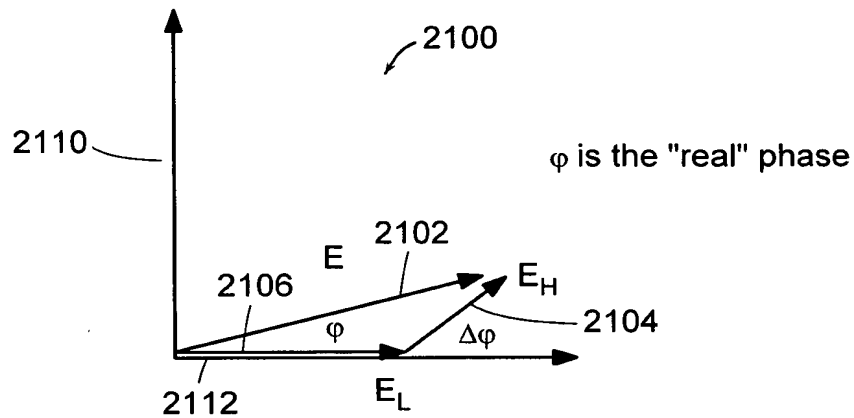


FIG. 61

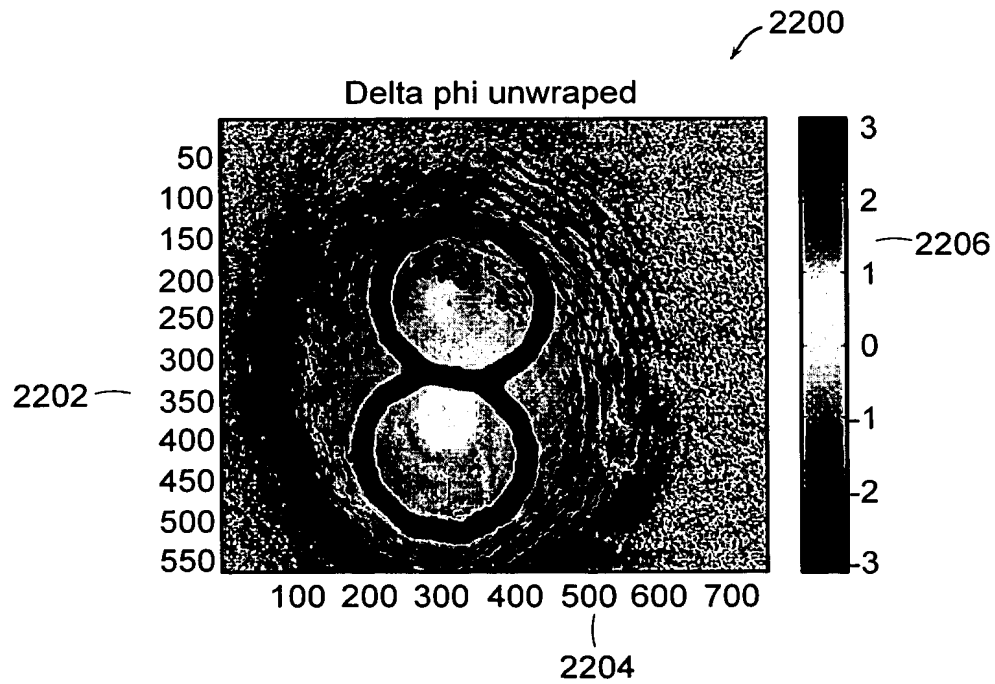


FIG. 62

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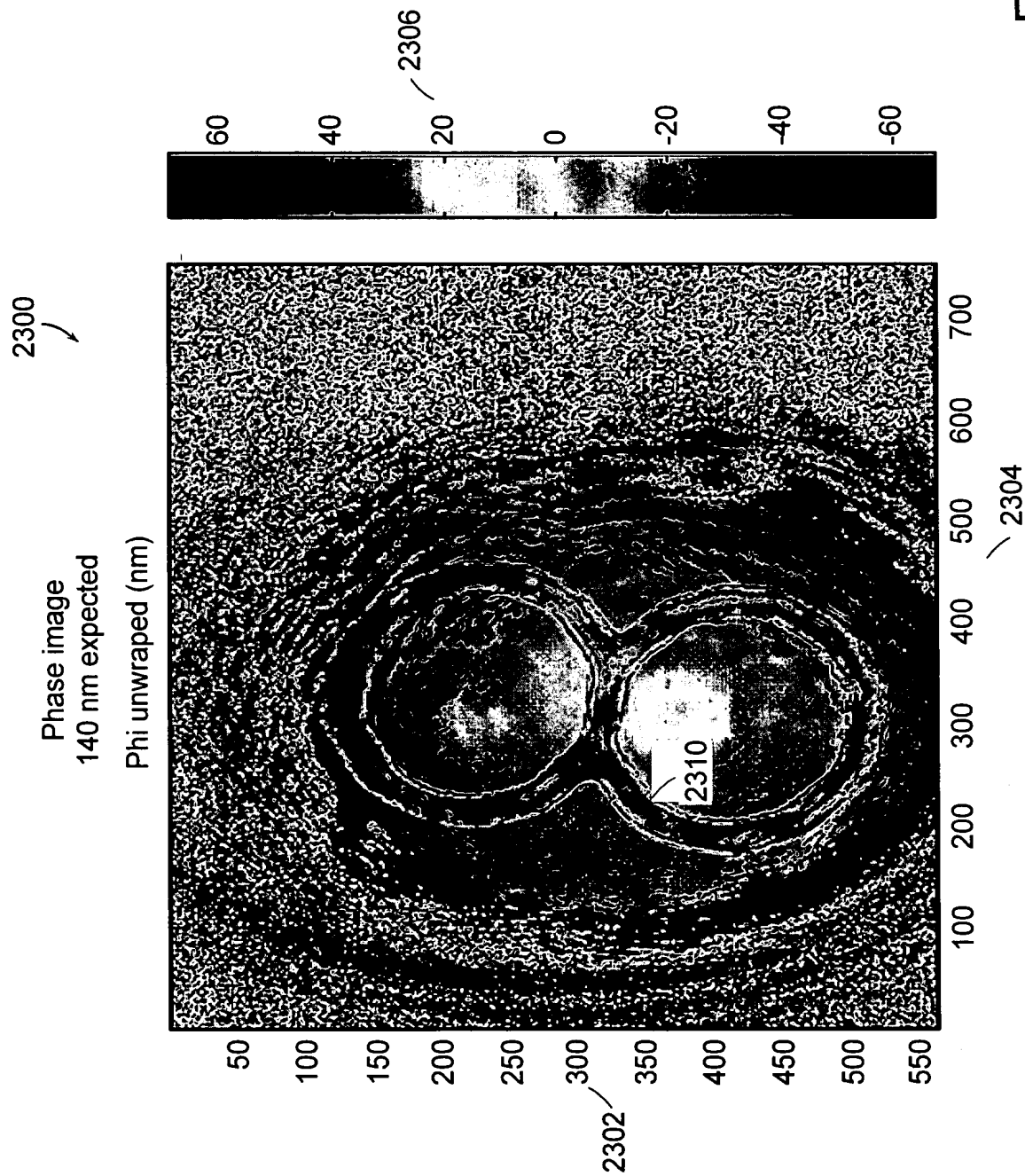
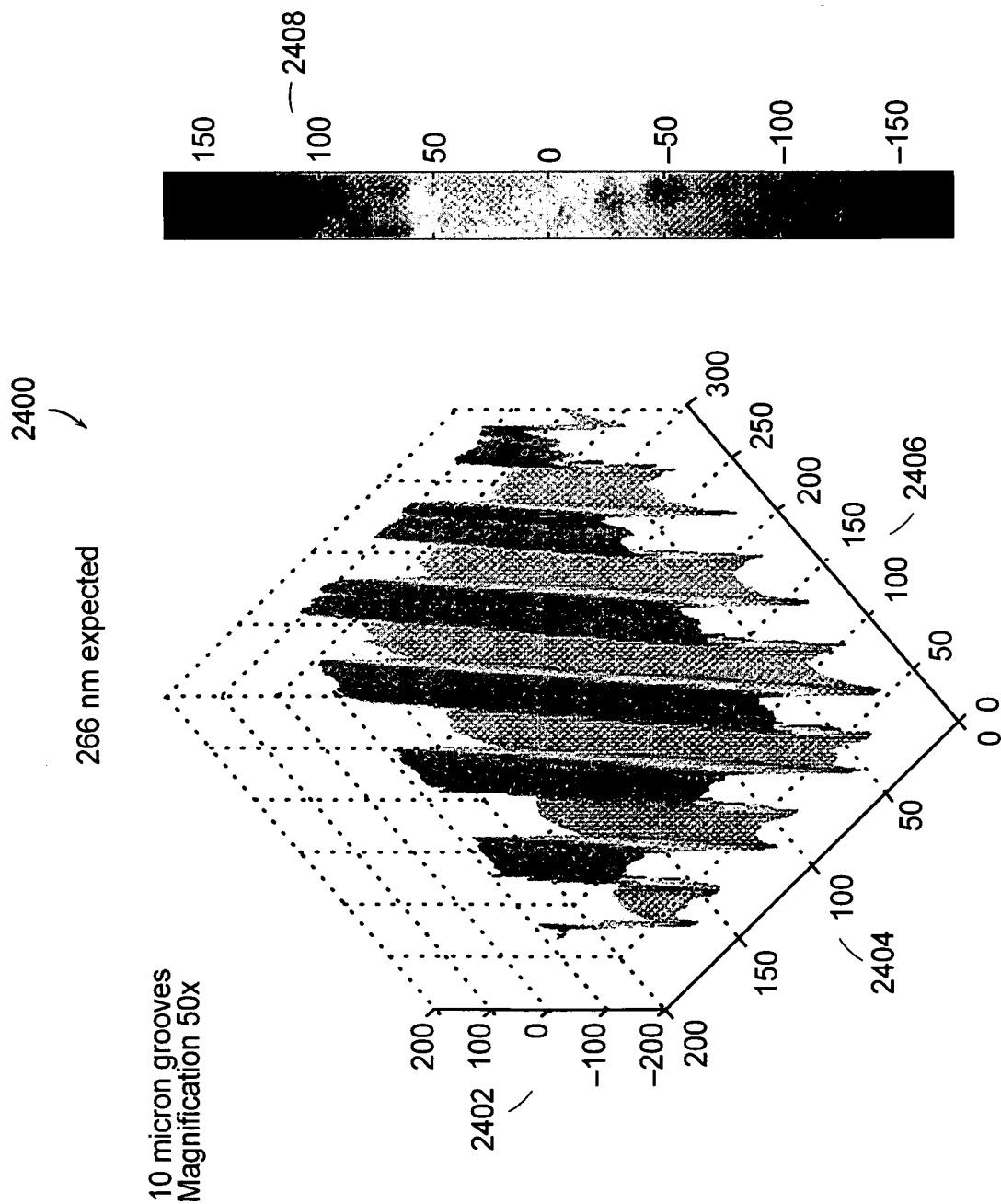


FIG. 63

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Onion Cells
Magnification 50X

2500

2550

Microscope (intensity) image

Phase image

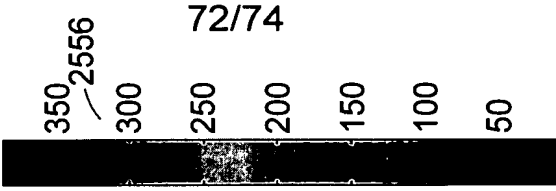
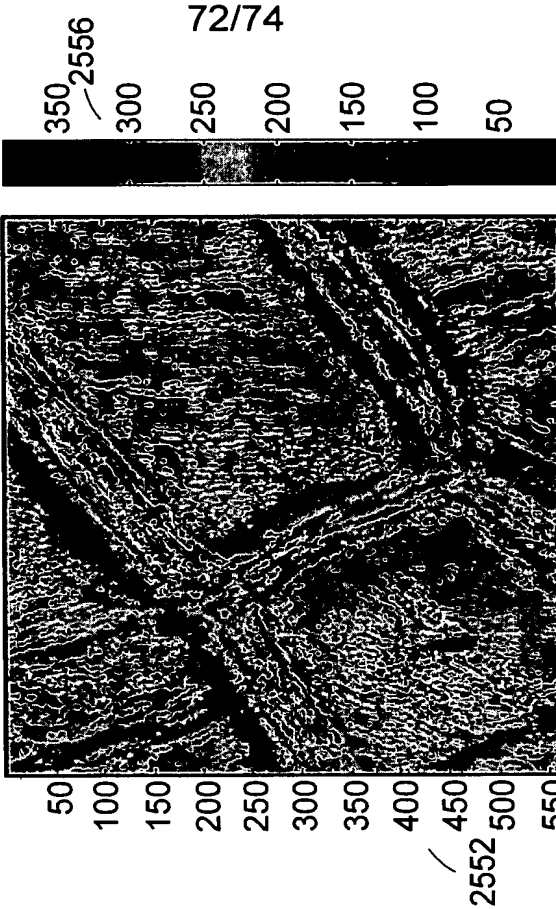
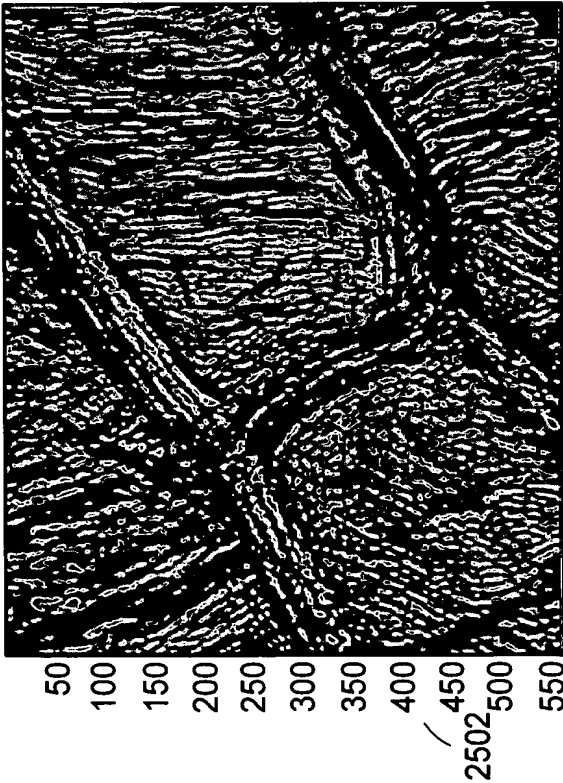


FIG. 65

FIG. 66

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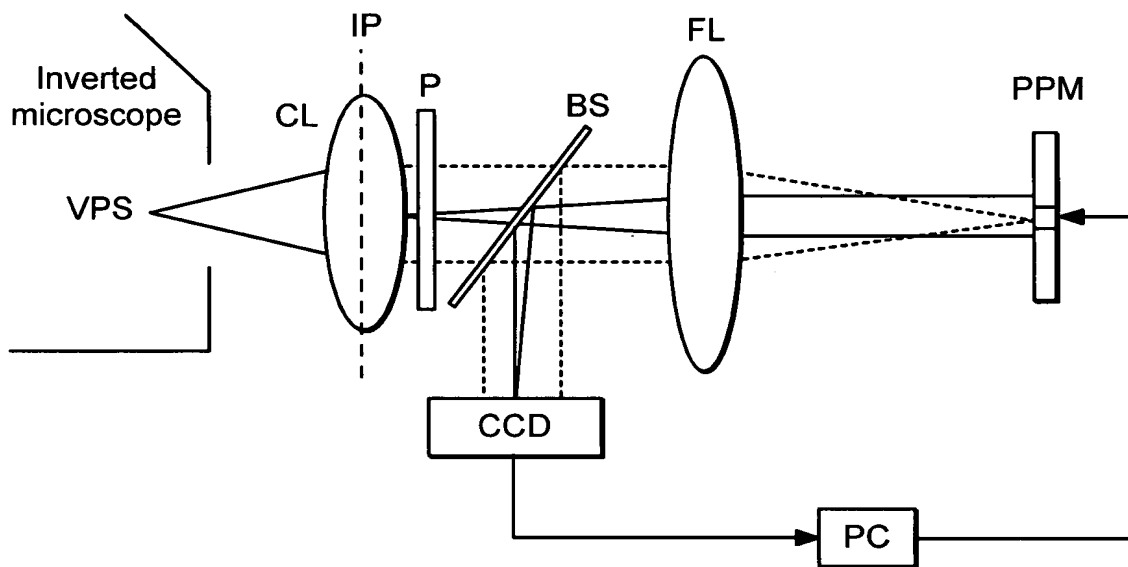


FIG. 67

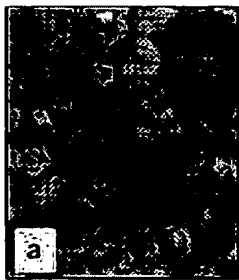


FIG. 68A

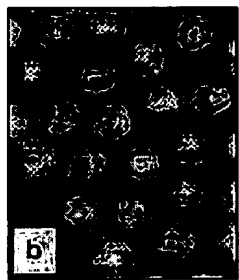
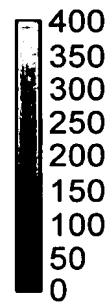


FIG. 68B



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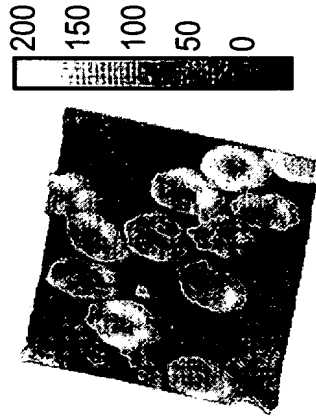


FIG. 69B

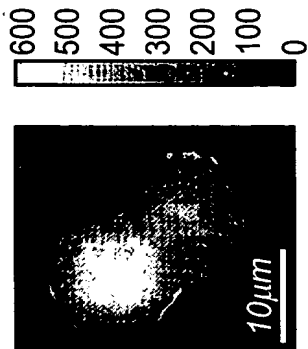
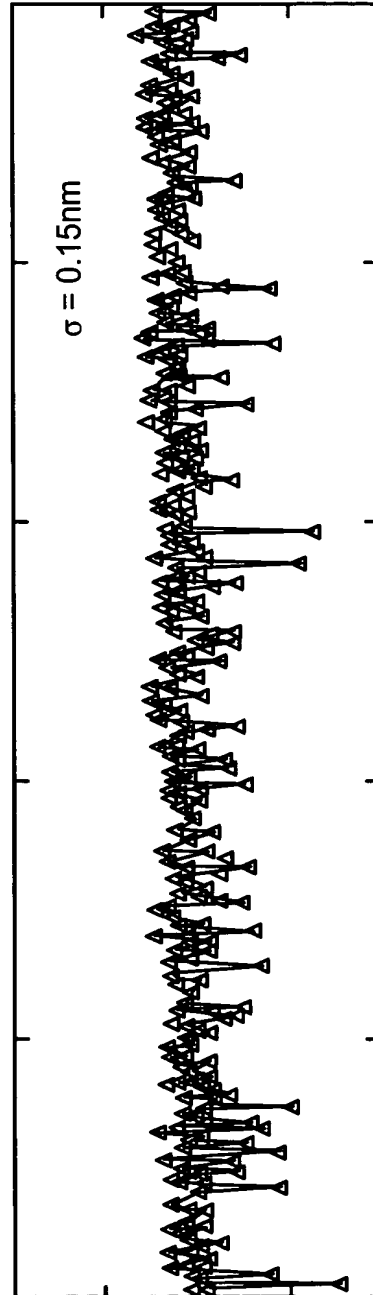


FIG. 69A



Time (min)
FIG. 69C

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